OCTOBER, 1956

American Engineer

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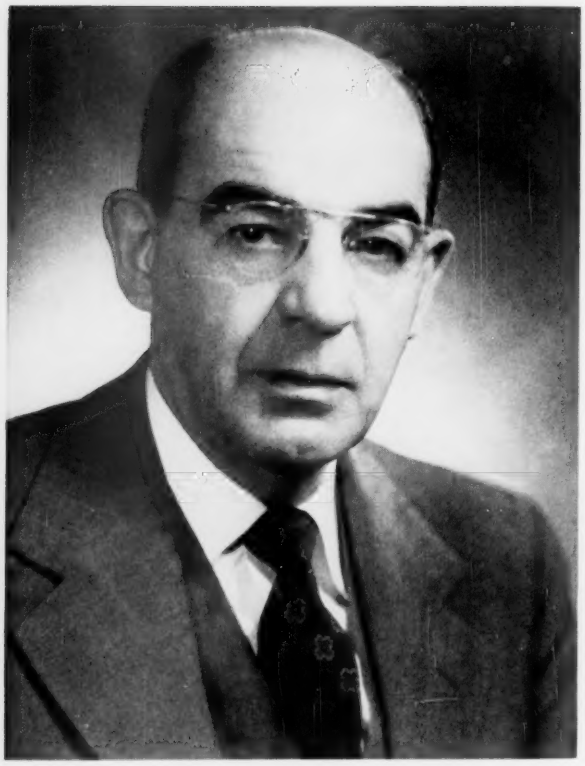
- **Our Successful Management Selection Program**

By

F. L. LARKIN, Vice President,
Wisconsin Electric Power Company



The Engineer As Citizen by Morris Llewellyn Cooke, P. E.

Engineers and National Defense by Roger W. Fulling, P. E.

Plus Latest Washington, Professional, and National Engineers' Week News

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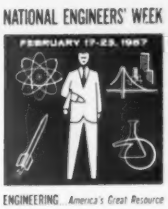

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Letters to the Editor

Money and Careers . . .

Dear Editor:

Senator Wiley's article "Strengthening America's Engineering Resources," in the August issue, penetrates the heart of the engineering manpower shortage. I would like to add and support some detailed suggestions for implementing Senator Wiley's proposed remedies.

There has been a great amount of writing and talking about the engineering shortage. Senator Wiley has apparently diagnosed the problem as inadequate motivation. The final major step is the cure.

What are the primary motivations in selecting a career? A wide variety of opinions is available, but I urge the leaders of our profession to accept the fact that *money* is the fundamental motivation. In our culture, prestige follows closely behind money. Security is a direct function of income together with the confidence that income will continue. These are facts. They are not palatable to the idealist, and are not welcomed by those who write pay checks. But until they are recognized and accepted by all concerned, there will be no effective action to relieve the engineer shortage.

Then let's motivate the youngsters with money. That's not easy to do. It would be folly for a large corporation or a consulting engineer to give a blanket fifty per cent salary increase to all his employee engineers just because the professional societies say that we engineers need more money. Again, we have to motivate the employers to pay more. I know of no moral or patriotic impulse strong enough to motivate employers voluntarily to raise engineer's salaries. Competition for engineering manpower, however, is a workable motivation.

Now, the law of supply and demand undoubtedly works in the field of engineering manpower. But, our need to counter the military threat of Russia can hardly wait for the slow reaction of economic laws as they apply to a man's choice of a lifetime career. This shortage problem is an active threat to the national defense. It, therefore, falls squarely within the responsibility of the Federal Government. The Federal Government not only has the responsibility for solving defense problems, but, in this case, is probably the only agency capable of taking any really effective action in raising engineer income.

Let's suppose, then, that the Government establishes a salary level for engineers and scientists well above the current scale, raises civil service salaries accordingly, and also authorizes the same scale for all contractors and engineering firms engaged in Government work. The first effect would be the rapid filling of all engineer position vacancies in the Government and in the offices of Government contractors by movement of engineers from less attractive positions. The next effect would be a general increase in all engineering salaries due to the competitive effect on salaries. (The taxpayers and consumers would, of course, pay this increase, just as they have footed the bill for organized labor's spectacular gains.) A third effect would be a very definite and welcome elevation of engineering prestige and attractiveness as a career, providing a positive, realistic motivation, which would send an adequate stream of high quality students into engineering schools.

I, therefore, suggest that the economic law of supply and demand can be put into high gear at once by the enactment of federal legislation as follows:

1. Drastically increase the salary schedule for engineers and scientists employed by the Federal Government. By drastic, I suggest an increase not only above the level of union trades, but slightly above that of other professions competing for brainpower, say an increase of 30-50 per cent.

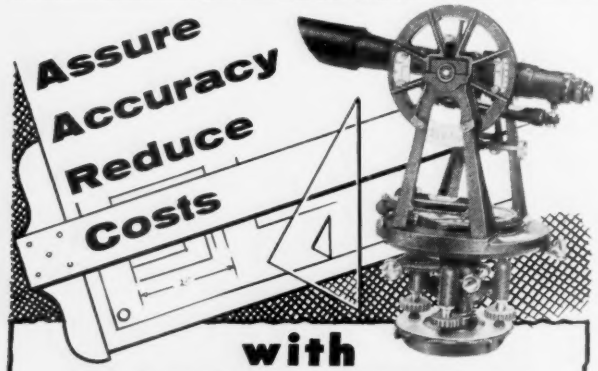
2. Authorize similar increases for engineer employees on Government cost-plus contracts, and renegotiate lump-sum contracts where such increases are actually met by the contractors.

3. Offer a direct Government subsidy to college engineering students, under contract to enter Federal employment for a period of four years after graduation. This could be handled very much like the ROTC contract. The law could provide for alternate discharge of the contractual obligation by entering the employ of certain specified defense industries, at the Government's convenience.

4. Make direct grants to engineering colleges for modern laboratory equipment, training aids, and faculty salaries.

The above steps all cost money, plenty of it, and for a long time. They will also dislocate the engineering salary structure throughout the profession. Other subsidiary problems will be created. Violent objectors will cry that the Government is unfairly competing on the engineering manpower market. But certainly such vigorous, positive steps would solve the immediate problems of (1) motivating young people to enter engineering, (2) attracting competent engineers to enter and remain in the Government service, and (3) elevating engineering to the income level and prestige which its educational demands and contribution to our society justify. I submit that we can either cry and deplore indefinitely without effect or we can take these concrete measures now, pay the inevitable cost, and solve the problem of the engineering manpower shortage.

CHAS. B. PEKOR, P.E.,
Houston, Tex.



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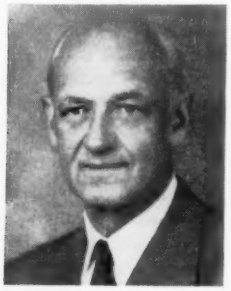
NSPE Fall Meeting Scheduled Oct. 25-26 In West Virginia

A warm welcome to members planning on attending NSPE's fall meeting, October 25-26, in White Sulphur Springs, West Va., has been voiced by Royal C. Bundy, president of the West Virginia SPE.

"No state is more fully aware of the important role engineers play in the industrial growth of our country," Mr. Bundy stated, "and we here in West Virginia with our mining and various industries feel indeed honored to host this meeting of the National Society. In the Greenbrier Hotel we boast a perfect meeting site," he added.



Royal C. Bundy, West Virginia SPE president, welcomes members to fall meeting.

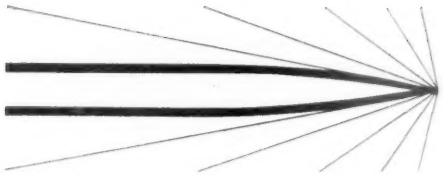
West Virginia Governor William C. Marland will open the session with a welcoming address at 9:00 a.m. on Thursday, October 25.

Much of the opening day will be devoted to professional meetings, which is scheduled to be interrupted only by regional luncheons. Mrs. Dorothy Draper, well-known interior decorator, will speak at a luncheon for the ladies. The six vice presidents of the National Society will preside over the mens' luncheons.

On the social side, folk and square dancing are planned for Thursday evening.

The professional meetings will continue on Friday and, in addition, a golfing demonstration by Sammy Snead, one of the top golf pros in the country, is scheduled for 1:30 p.m.

NSPE President Robert J. Rhinehart will preside over the wind-up banquet. Mr. Bundy will act as toastmaster.



MISSILE ENGINEERS

Many new positions are being created at Northrop Aircraft for missile engineers in a wide range of activity: control, guidance, servo, computers, recording, optical, reliability, electro-mechanical, telemetering and electronics. There's an interesting position for you, at your own experience level, with attractive remuneration and steady advancement, in one of the following groups:

GUIDANCE AND CONTROLS, encompassing research and development of advance automatic guidance and flight control systems for both missiles and piloted aircraft. Specific areas of development include: radio and radar systems, flight control systems, inertial guidance systems, instrument servo systems, digital computer and magnetic tape recording systems, airborne analogue computer systems, optical and mechanical systems, and systems test and analyzer equipment.

FLIGHT TEST ENGINEERING SECTION, which plans the missile test programs and establishes test data requirements in support of the programs. The data requirements are predicated on the test information required by the engineering analytical and design groups to develop and demonstrate the final missile design, and are the basis from which instrumentation requirements are formulated.

The analysis work performed consists of aerodynamic, missile systems, dynamics, flight control, propulsion and guidance evaluation. The Flight Test Engineering Section is also responsible for the field test program of the ground support equipment required for the missile.

FLIGHT TEST INSTRUMENTATION SECTION, which includes a Systems Engineering Group responsible for the system design concept; a Development Laboratory where electronic and electro-mechanical systems and components are developed; an Instrumentation Design Group for the detail design of test instrumentation components and systems; a Mechanic Laboratory where the instrumentation hardware is fabricated; and a Calibration and Test Group where the various instrumentation items and systems are calibrated and tested.

For 17 years Northrop Aircraft has pioneered in missile research and development. As a member of this forefront organization in this growing field, new opportunities for full expression of your initiative and ability will always be yours at Northrop.

If you qualify for any of these attractive positions, we invite you to contact the Manager of Engineering Industrial Relations, Northrop Aircraft, Inc., telephone ORegon 8-9111, Extension 1893, or write to: 1015 East Broadway, Department 4600-G, Hawthorne, California.

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PROFESSIONAL NEWS IN CAPSULE FORM

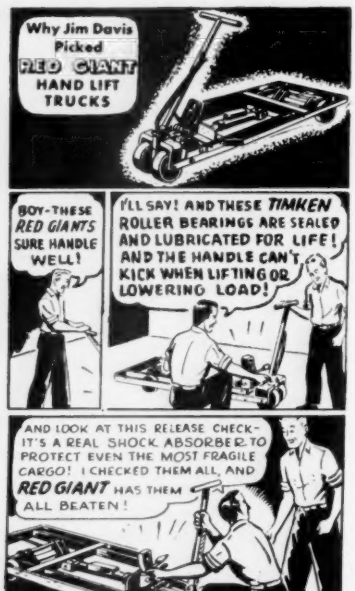
A Roundup of Late Events for Professional Engineers

John Powell Named City Manager In Decatur, Ga.

John D. Powell, a member of NSPE, has been named city manager of Decatur, Georgia, effective October 1. Since 1946 he has been engineer in charge of utilities design and operation at the Georgia Institute of Technology.

Mr. Powell, who was graduated from Georgia Tech in 1932 with a B.S. degree in electrical engineering, was selected from a group of twenty applicants for the position in Decatur, a city of about 30,000 population located just east of Atlanta.

He is presently serving as executive secretary of the Georgia SPE.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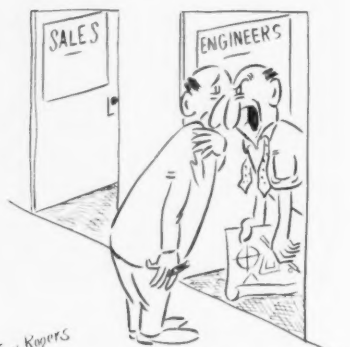
Engineering Secretarial Course To Train Aides For Professional Work

An engineering secretarial course, a unique educational program inaugurated last year by the Business Training College in Pittsburgh, is fast proving to be a boon to the busy and harried professional engineer.

As soon as the program was initiated the dean, Mrs. Phyllis Davis, was deluged with calls from the engineering profession for the college's graduates. However, the course is of two years' duration and the first graduates will not become available until June of next year.

The college has planned the engineering course to give students a scientific background in addition to secretarial skills such as shorthand and typing. The background subjects include chemistry, physics, advanced mathematics and the terminology of the various fields of engineering. There is also an intensive course in filing and blueprint reading.

The college realizes that for professional training it is most important to select students who have not only an interest in the field but who have the innate ability, aptitudes and intellectual curiosity necessary for scientific professional training.



"Stop Peeking! It is not ready to sell!"

Energy Resources To Be Discussed At Conference

What is the future of nuclear energy? Coal, gas, petroleum, oil shale, and solar energy?

These are the questions to be posed to the first annual Energy Resources Conference in Denver, October 29-31.

An outstanding list of conference speakers and panelists will discuss these questions, and provide answers to many problems in the fields of energy for company executives, scientists, and researchers concerned with the long range implications of energy resource development.

Program chairman Dr. Fred W. Brown, director of the U.S. Bureau of Standards Laboratory at Boulder, Colorado, has scheduled an imposing list of top men who will give papers. Formal meetings will be held at conference headquarters in the Cosmopolitan Hotel, while the third day of the meeting will be devoted to field trips to scientific and research centers in the Denver area.

New Department Heads Appointed At Duke Univ.

Dr. Paul M. Gross, Duke University vice president in the Division of Education, has announced the appointment of two new departmental heads in the College of Engineering at Duke.

Dr. Robert S. Rowe, an NSPE member, will become chairman of the Department of Civil Engineering and James N. Macduff will head the Department of Mechanical Engineering.

Elect Litehiser ASTM Director

The election of R. R. Litehiser as a director for the American Society for Testing Materials has been announced. A member of NSPE, he is engineer of tests for the Ohio State Highway Testing Laboratory.

Dr. Snell Takes Three Month Trip To Far East

Under the auspices of the World Health Organization, a technical branch of the United Nations, Dr. John R. Snell, a partner in the consulting engineering firm of Michigan Associates, Lansing, Michigan, left in August on a three month visit to the Far East.

Although the initial purpose of Dr. Snell's visit is to check on the operation of the first Far East high-rate composting plant constructed in Kobe, Japan, his trip has been expanded by the World Health Organization to include study of the waste treatment and disposal problems in six different countries in the Orient.

Dr. Snell is a member of NSPE.

Management, Labor Views To Be Presented

Representatives of management and labor will give their views on technological progress in industry at the opening session of the sixth annual Tool Engineering Conference in Chicago, November 2-3.

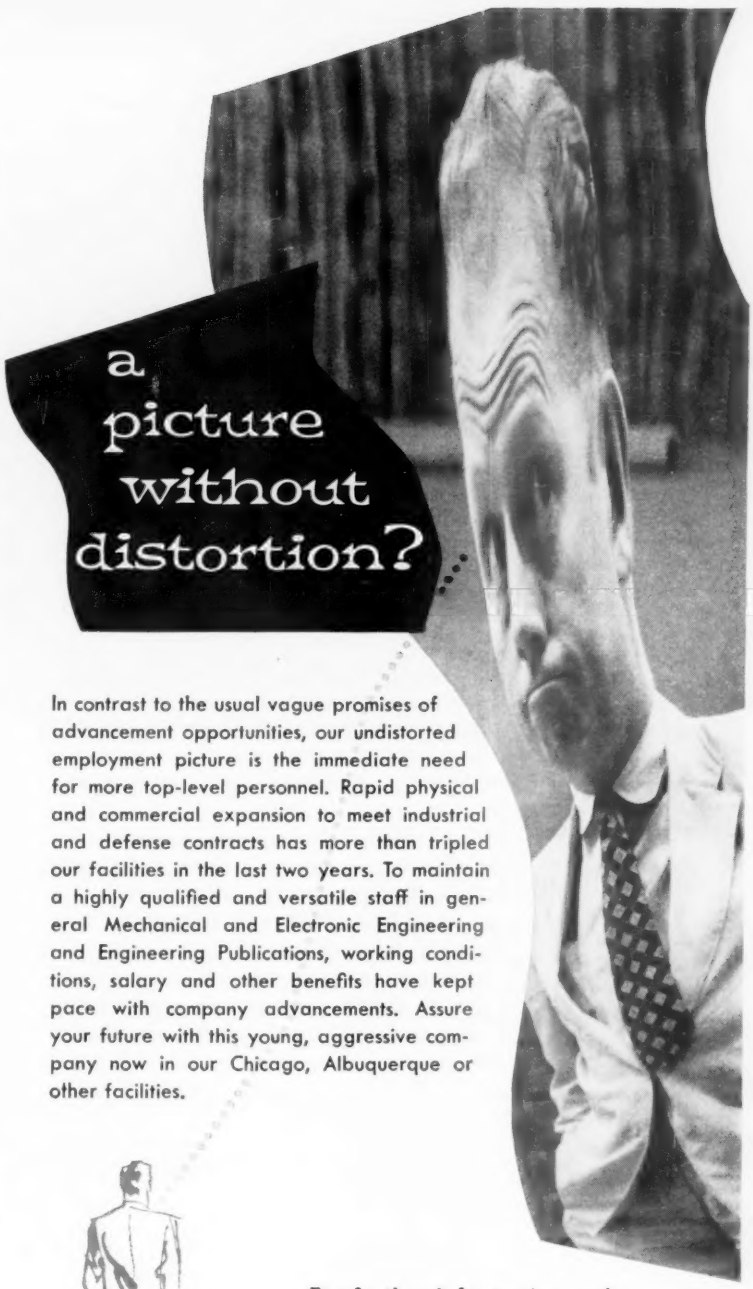
Dr. Harry Osborn, technical director of the Tocco Division of the Ohio Crankshaft Company, Cleveland, will present management's viewpoint, and P. L. Siemiller, general vice president, International Association of Machinists, Chicago, will speak for labor.

Their talks will follow an address on "Research and Development for Industry" by Dr. Richard F. Humphreys, assistant director of Armour Research Foundation of Illinois Institute of Technology.

The conference, the theme of which is "New Horizons in Industry," will be held on the Illinois Tech campus.

Egli Is Elected Fellow In ASME

A member of NSPE, Huldreich Egli, Baltimore, Md., has been elected to the rank of Fellow of The American Society of Mechanical Engineers. A nominee to the rank of Fellow must be an engineer of acknowledged professional attainment and have twenty-five years of active practice, either in engineering or in the teaching of engineering.



In contrast to the usual vague promises of advancement opportunities, our undistorted employment picture is the immediate need for more top-level personnel. Rapid physical and commercial expansion to meet industrial and defense contracts has more than tripled our facilities in the last two years. To maintain a highly qualified and versatile staff in general Mechanical and Electronic Engineering and Engineering Publications, working conditions, salary and other benefits have kept pace with company advancements. Assure your future with this young, aggressive company now in our Chicago, Albuquerque or other facilities.

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Admiral Moreell To Get John Fritz Gold Medal

The John Fritz Medal Board of Award, representing four major national engineering organizations, has announced at its headquarters in New York City that its award of the Medal will be to Admiral Ben Moreell, of Pittsburgh, chairman of the board of Jones & Laughlin Corp. and, in World War II, famed organizer and commander of the Navy's "Seabees."

The award is sponsored jointly by the American Society of Civil Engineers, the American Institute of Mining, Metallurgical and Petroleum Engineers, The American Society of Mechanical Engineers, and the American Institute of Electrical Engineers.

Presentation of the gold medal and certificate signifying the honor will be made October 17 in Pittsburgh during the national convention of the ASCE.

Admiral Moreell was voted the award as a "distinguished engineer and noted officer; builder of Naval works in war, and in peace eminent industrialist and civic leader; devoted servant of church and country."

"Airborne Electronics Week" Set In Maryland

The electronics industry and the State of Maryland may perhaps claim another "first" as a result of recent action by Maryland Governor Theodore R. McKeldin who has proclaimed the week of October 29 as "Airborne Electronics Week" in Maryland.

The Governor's proclamation, issued in connection with the Third Annual East Coast Conference on Aeronautical and Navigational Electronics to be held in Baltimore's Fifth Regiment Armory, October 29-30, is believed to be the first state-wide recognition of the importance of airborne electronics.

The East Coast Conference is jointly sponsored by the Baltimore Chapter of the Institute of Radio Engineers, the Professional Group on Aeronautical and Navigational Electronics, and the electronics industry. Nearly 2,500 engineers, scientists, and industrial representatives are expected to attend the technical program and industrial exhibition during the two-day meeting.

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Color Film Available— "Fashioning the Future"

Opportunities for the college-trained engineer and scientist in the petroleum industry are explored in a new 16mm-sound color film, "Fashioning the Future."

The twenty-four minute film is being made available on free loan to engineering colleges by Universal Oil Products Company, Des Plaines, Illinois.

Engineering colleges and student engineering societies may borrow the film by writing to the Modern Talking Picture Service, 3 East 54th Street, New York 22, N. Y.

Transportation Center Begins Research Study

A unique attack on the problems of a basic industry will begin October 5 when the Transportation Center at Northwestern University launches its national program of research, education, and service.

Organized specifically to meet the need for a fresh and integrated approach to transportation problems of steadily increasing complexity, the Center represents a new phase in industry-university cooperation. With substantial support from all segments of America's transportation system—railroads, airlines, ocean and inland waterway shipping lines, pipelines, and highway transport — the new Center will operate within the administrative framework of Northwestern.

Electronics Progress Theme of Conference

"Fifty Years of Progress Through Electronics" will be the theme of the twelfth annual National Electronics Conference in Chicago, October 1-3.

Approximately 100 technical papers and a record 240 commercial exhibits will be featured at the three-day conference. More than 10,000 persons are expected to attend the meeting—the nation's leading forum on electronic research, development, and application.

The conference is sponsored annually by the American Institute of Electrical Engineers, Institute of Radio Engineers, Illinois Institute of Technology, University of Illinois, and Northwestern University.

Engineer H. P. Jandacek Receives Commendation From Air Force Dept.

H. Paul Jandacek of Minot, N. D., chief of the Design and Construction Section at Goose Air Base, Labrador, has been awarded the Department of Air Force Commendation for Meritorious Civilian Service by Brig. Gen. J. B. Knapp during a formal review.

Mr. Jandacek's citation, read before the officers and airmen during the review, was as follows:

"During the period 26 July, 1953, to 18 January, 1956, Mr. H. Paul Jandacek, assistant installations engineer, Goose Air Base, accomplished his duties in a manner far above the requirements expected of his position. By his innate ability, professional knowledge, experience and initiative, Mr. Jandacek has succeeded in saving thousands of dollars for the United States Government and contributed substantially to effective accomplishment of the mission of Goose Air Base."

A former CAA district airport engineer for the State of North Dakota, Mr. Jandacek has been with the Air Installations Squadron at Goose Air Base since 1953. During the past three years the base has undergone extensive construction amounting to more than a $100 million investment on the part of the U.S. Government.

It is the responsibility of Mr. Jandacek—a member of NSPE—to advise the USAF on the acceptance of construction work at the air base.

His award was given on the basis of a construction project which he supervised and completed at a twenty-five per cent reduction of the estimated cost.

OCTOBER MEETINGS OF NOTE

National Electronics Conference—Annual Convention, October 1-3, Hotel Sherman, Chicago, Illinois.

American Institute of Electrical Engineers—Fall Meeting, October 1-5, Morrison Hotel, Chicago, Illinois.

Standards Engineers Society—Annual Meeting, October 3-5, Hotel Willard, Washington, D. C.

Tau Beta Pi—October 11-13, Annual Convention, University of Kansas, Lawrence, Kansas.

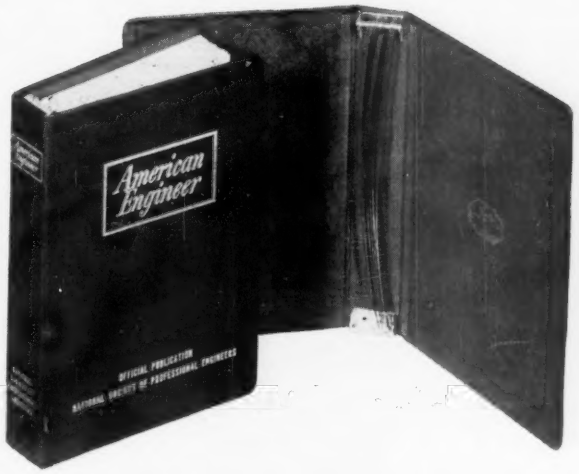
American Society of Civil Engineers—October 15-19, Fall Convention, William Penn Hotel, Pittsburgh, Pa.

Institute of Management Sciences—October 18-19, Annual International Meeting, Statler Hotel, Los Angeles, Calif.

Engineers' Council For Professional Development — October 25-26, Annual Meeting, Engineering Society of Detroit Headquarters, Detroit, Mich.

East Coast Conference on Aeronautical and Navigational Electronics — October 28-29, Annual Meeting, Fifth Regiment Armory, Baltimore, Md.

By Popular Demand



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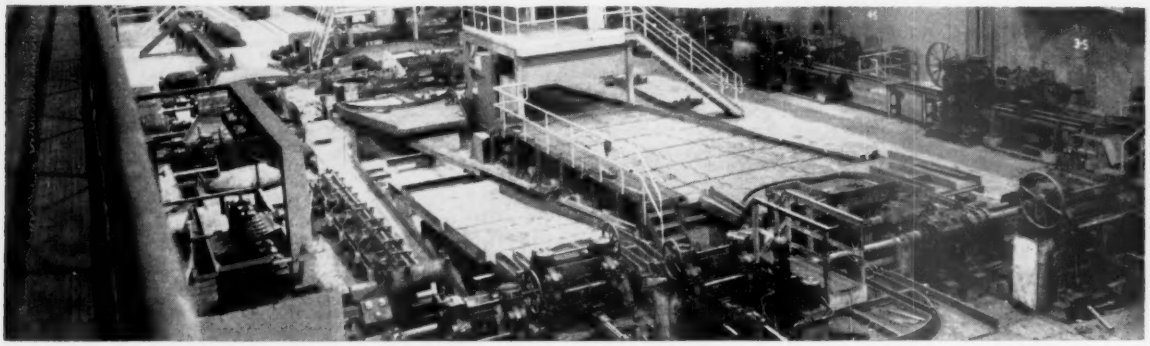
VOLUME TWENTY-SIX NUMBER TEN

Another of the "Professionalism in Industry" Series



OUR SUCCESSFUL MANAGEMENT SELECTION PROGRAM

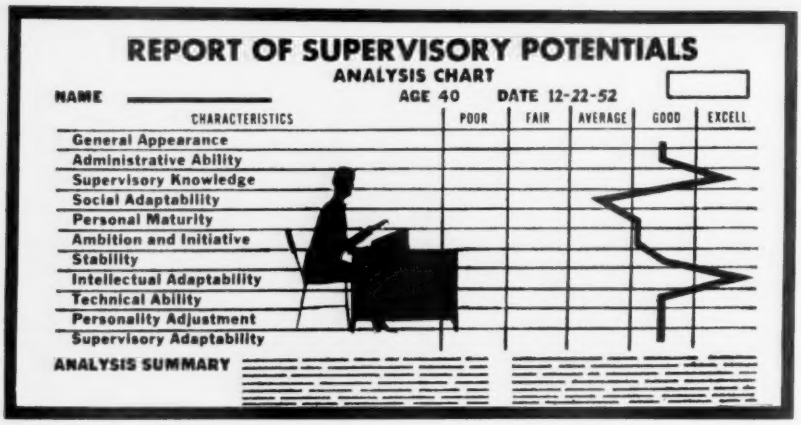
By F. L. Larkin,

Vice President, Wisconsin Electric Power Company

AN INCREASINGLY important job of management today is that of insuring its succession. With the growing complexity of modern industrial patterns, each company, no matter what its field of operations, must make certain that it has a sound managerial setup and that the people who are holding supervisory and managerial positions, or who are slated to move up to them in the future, are truly competent and are endowed with the necessary qualities of leadership.

Whatever management accomplishes, it accomplishes through people. And people represent one of the most mercurial components with which we have to work. More and more firms are discovering—sometimes the hard way—that the old-fashioned criteria for moving employees into advanced management positions are not always the best gauge of leadership potential. Seniority, loyalty, diligence, number of college degrees, skill in a particular technical specialty, while they are factors which must be taken into account, unfortunately are not always an indication of managerial ability. The truly good executive develops from within, and no amount of training or experience will make a first-class manager out of a person who does not possess the basic qualities required for supervisory and administrative work.

Management development programs are often wise and commendable and may at times be absolutely demanded by the exigencies of modern technological progress; but in order that they may be successfully carried out in any industry, it is essential that the participants have a basic aptitude for leadership. In the utility field, particularly, where large numbers of college-trained persons are employed, a high degree of technical competence can all too easily be confused with management capacity. A corollary of this is that where there are many persons employed in



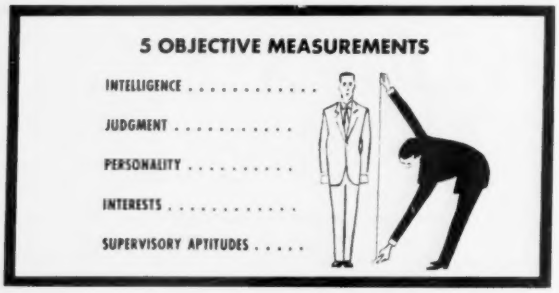
This example of "burial" is typical of a cause which is becoming altogether too common—burial by specialization. The analysis chart here indicates capacity for at least the division head level. This employee was engaged in highly specialized accounting work where there was no supervisory or administrative responsibility. He was thoroughly competent but the interview and tests revealed a high degree of frustration because the narrowness of his specialized work provided no opportunity to use his inherent administrative capacity. In many cases this precise situation turns high caliber men into aggressive union officers and stewards or disgruntled employees.

strictly technical work, sometimes their managerial talents remain so obscured that they never receive the boosts they deserve into first-line administrative positions.

What is needed, therefore, in the first file in the front office is an inventory record that will show the company's chief officers where the potential managerial talent lies. Only with this sort of ready reference can a firm be sure that the right men are in line for appropriate promotions as circumstances demand and that it has a sufficient reservoir of leadership ability within its own ranks on which to draw in the future.

Such an inventory can be made with the help of the social scientists, who have been making tremendous strides in achieving down-to-earth, practical industrial applications of their greatly increased knowledge. The words *psychologist* or *psychometrist* do not need to frighten us. At the Wisconsin Electric Power Company we have found that the men who wear these titles are equipped to make an invaluable contribution to the preparation of a balance sheet of executive talent at all levels.

In our particular case, the decision to undertake the task



The third and by far the most important tool for measuring management capacity is a battery of five objective tests. By "objective" is meant that the personal element is largely removed; a camera is objective, a meter is objective. They have no malice or envy, no opinions. These tests are an excellent pickaxe to dig beneath the surface in the areas of intelligence, practical judgment, personality analysis, vocational preferences or interests, and supervisory aptitudes. Of these several categories of human characteristics, the "intelligence factor"—the I.Q.—is the most widely used and probably the least indicative of who is or is not good potential management material. The "personality analysis" is the newest tool and the only one which can truly be called "psychological" or "psychometric." Its function is to reveal that which lies beneath the surface of the individual and which is not readily observable to the interviewer or rater—facets of character frequently not properly recognized or understood by the person possessing them. The application of the tests requires from six to eight hours and normally leaves the subject somewhat limp.

of inventorying our staff to determine the "rightness' of the men for their various jobs, the prospective executive material "lost" or not in the best position for full development, and any unfortunate instances of a job's being beyond the man assigned to it, came as the result of our rapid expansion as we emerged from the war years. Our supervisory forces, and the reservoir of mature technical employees from which the management of an electric utility is normally replenished, revealed the unfortunate results of a long dearth of employment which had extended from the lean depression years through the war. Quite literally, part of an entire generation of potential management people was missing, and as a result the usual process through which people gravitate toward supervisory positions simply was not working out very well. Yet we were convinced that among our personnel there were those who must possess the essential endowments that contribute to sound leadership. The question was "Where?"

Thus in a sense we became pioneers in planning our program to develop a balance sheet of executive talent. The over-all inventory would depend on an evaluation of individuals. The evaluation would necessitate the use of various measuring devices, or tests. And at that time—1947—the available data on the development and use of practical selection tests presented little evidence of the successful use of such tests in the "executive brackets." We had, I must admit, our own misgivings when we considered the task of integrating the recently-evolved — and still evolving—testing practices of the social sciences into the process of selecting people for management posts in a highly technical business which had grown and prospered on the rigid backbone of the engineering sciences. Yet a beginning had to be made.

Three years were spent in doing the groundwork—in research, surveys to determine needs, finding and shaping the "tools" of measurement, making "trial runs" to check the validity of our tests—before we were confident that we did indeed have a sound method of appraising management capacity even in people who had never held a supervisory position. In fact, we felt our rating method would work even with people we had never seen before.

IT TOOK another three years to complete the actual inventory. But by 1953, after he had "processed" nearly 600 individual staff members, we knew that we had for the first time a balance sheet of management manpower that gave us an over-all picture of our human assets, liabilities, and reserve strength. With our newly-developed analysis charts, we could see in graphic form the entire supervisory force which is spread out over a territory of some 12,500 square miles, with a concise appraisal of

each individual indicating whether his qualifications and capacities were above or below his current position, the potential or unused capacity he might have for greater responsibility, a prediction of his probable maximum capacity in terms of job level, and his specific strengths and weaknesses.

Our evaluation plan is well-balanced. It is not a magic formula, not a gimmick that grinds out a score. Its validity was originally established by experimental statistical techniques; but as the record is being built up from actual operations, the proof of its soundness is also growing.

In order to provide checks and balances, the evaluation process has three distinct parts—ratings, interviews, and tests.

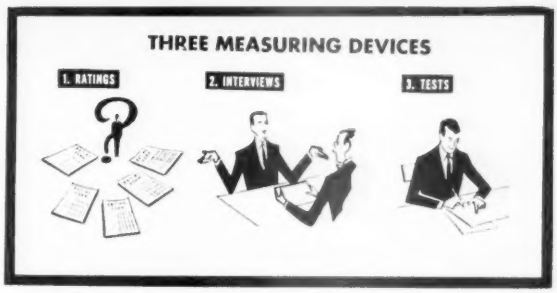
First is the subjective rating of an individual, which of course can only be used for present employees. This rating is done by a minimum of three, and preferably by five, work associates who are either his superiors or his peers—but never his subordinates. The characteristics on which we ask for a rating are well-defined and the form we use is a simple one. We provide a scale for each of eleven characteristics subdivided into several degrees from poor to excellent on which the rater can place a check mark at a point which he believes measures the degree to which the employee being rated possesses a specific characteristic, such as mental capacity, judgment, human relations, aptitude, and so on. The rater is also required to record his over-all opinion of management potential in terms of the various levels of management. such as general foreman, superintendent, or department head.

This, therefore, is the way we collect opinions. We minimize the subjective character of the ratings by using multiple judgment. However, as a word of warning, this technique of evaluation should never be used as the *only* one, because opinions and impressions can prove unreliable, even when the sampling is broad. It is important to use it in conjunction with the other measuring devices which *combine* to produce the final accurate analysis of the employee being rated.

The second measuring device then, which we use at Wisconsin Electric, is the pattern interview or, as it is sometimes called, the "depth" interview. This is conducted by the trained industrial psychologist in a friendly and informal manner. Through this technique, we expect to gain an insight into such characteristics as temperament, logic, and insight into leadership and human relations problems. The trained interviewer uses priming questions and provocative statements fitted to his needs, but only to the extent necessary to speak the employee's self-expression within a pattern which will demonstrate the type of thinking he can do and reveal some of the other characteristics just named.

Although the results of an interview are normally classified as subjective criteria, too—that is, the personal conclusions of the interviewer—they most certainly approach the objective level when the interviewers are skilled technicians who approach the interview impersonally and whose sole purpose is to obtain information of an almost "clinical" nature which will be used as fill-in material later on when the final appraisal is made using information from all sources.

THE THIRD, and by far the most important, tool for measuring management capacity is a set of five objective tests. The tests we use are prepared specifically to check out intelligence, judgment, personality, interests, and supervisory aptitudes. These characteristics are also covered in the ratings and the interviews, but now they are being tested in black-and-white where there are no preconceived notions whatsoever to color the results.

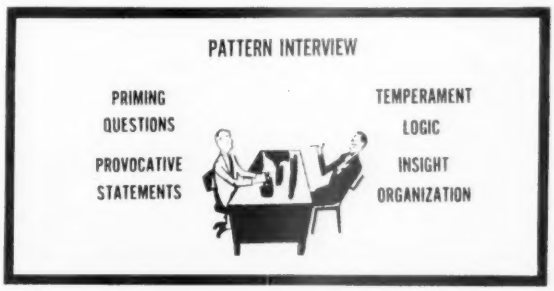


In order to provide checks and balances, the evaluation process has three distinct parts—ratings, interviews, tests. First is the subjective rating of individuals, which can only be used for present employees.

The intelligence, or IQ, test is one of the most simple and most widely-used tests today, but it *must not be used alone.* A high IQ unfortunately does not always indicate management capacity. A person who rates excellent in his qualifications for any number of specific jobs may not always be the man with the administrative talent. The IQ factor can sometimes prove a poor guide to selection if other qualities are not considered in connection with it.

The personality analysis is the newest tool, and one which can be correctly termed "psychological" or "psychometric." Its purpose is to reveal facets of character not readily observable to the rater or interviewer and frequently not recognized or understood by the person possessing them. The results are invaluable, both in supplementing the data assembled about a known employee or in facilitating an accurate appraisal of a candidate for a management position from outside the organization.

Thus we were able to evaluate our staff. Then we could develop analysis forms and a concise written summary analysis on each individual for consideration when promotions or job transfers had to be considered. We prepared visual presentations that reflected the managerial strengths and weaknesses at all levels. And while there



The second of the three tools is the pattern interview—sometimes called "depth" interview—conducted by skilled interviewers who are trained psychologists. There is no atmosphere of formality. The trained interviewer uses priming questions and provocative statements fitted to his needs but only to the extent necessary to spark the employee's self-expression within a pattern which will demonstrate the type of thinking he can do, his temperament, logic, insight into basic leadership and human relations problems, and ability to organize his thoughts. Although the results of an interview are normally classified as subjective criteria—that is, conclusions of the interviewer—they approach the objective when the interviewers are skilled technicians whose sole purpose is to obtain information of an almost "clinical" nature which will be used as fill-in material (sidelights, angles) later on when the final appraisal is made using information from all sources. The value of the interview is proportional to the skill of the interviewer.

The author points out that the problem of selection of future management is a serious one, both to the individual company concerned and also, in the over-all picture, to the nation as a whole. The writer says that the demand for administrative talent will not lessen tomorrow but will grow in direct proportion to the whirlwind advance of science and technology.

were some unpleasant surprises when we discovered individuals in jobs that were straining their capacity far beyond their personal capacity, we were more than delighted with the number of employees "discovered" in lower echelon positions who had the potentialties for work at much higher levels.

Now we are in a position to do away with the burial of talent by seniority, by geography, by jealousy, or by specialization. Also, we have most certainly struck a blow for higher employee morale. A man in a relatively minor position in a small division office rather remote from our headquarters no longer remains an unknown quantity to the top executives in the main office. If he has the capacity to handle bigger jobs, he knows that he will not be overlooked when openings are available. Nor can be he submerged by the dominant, aggressive personality of an immediate superior who might be reluctant to delegate responsibility to a degree that would show that his subordinate was equal to or more capable than himself. His evaluation shows not only his past record, but also his potential for the future. And we are not afraid to cross divisional and departmental lines to see that the right men are moved into positions where their capabilities can best be developed and they can see that they are headed for the top if their talents warrant this.

ANOTHER POINT is that we can rule out many probable failures by not asking a man to move into a position in which he will be taxed beyond his maximum ability. The promotion that goes awry is costly to the company and shattering to the man who might have served long and usefully and happily in one position but must be asked to resign when he does not measure up to a new post.

The problem of the selection of future management is a serious one, both to the individual company concerned and also, in the over-all picture, to the nation as a whole. We simply cannot afford the tremendous loss of capacity resulting from wasted or hidden talent. We must not be satisfied with hit-and-miss selection policy. Those of us who comprise today's management hold the future in our hands. The demand for topnotch administrative talent will not lessen tomorrow. It will grow in direct proportion to the whirlwind advance of science and technology. We must, therefore, chart the way to the future and establish a clear path by which tomorrow's managers can climb to the peak of maximum achievement.

The use of scientific methods in the area of management appraisal and selection is typical of the problem-solving spirit of an industry in which engineers must always play so prominent a role. We do not claim that the management selection program of the Wisconsin Electric Power Company is perfect, but we do know from experience that it is a much better way than any we have followed in the past. It has removed much of the guesswork from the process of planning management succession. It has given us a sounder, more reliable and alert organization.—***End.***

About the Author . . .

Mr. Larkin

Graduating from the University of Michigan in 1923, Mr. F. L. (Bud) Larkin accepted an industrial engineering assignment in the automotive industry. In the latter part of 1924 he moved to the Wisconsin Electric Power Company, then known as the Milwaukee Electric Railway and Light Company, and worked as a management research engineer until 1944, when he was promoted to his present position of vice president. His responsibilities include industrial engineering, administration of wage incentive plans, labor relations, the selection and placement of new workers, employee training, and accident prevention.

He is a director of Wisconsin Michigan Power Company and Wisconsin Natural Gas Company.

Wisconsin Electric Power Company has received national recognition for its accomplishments in the field of industrial relations and specifically for its pioneering work in applying scientific procedures in the important area of selecting people for management. The Wisconsin Electric Plan involves a balanced program of ratings, pattern interviews and objective tests for evaluating management potential which, over a period of nine years, has built up an impressive record of validity.

ENGINEERS AND NATIONAL DEFENSE

By Roger W. Fulling, P.E.,

Engineering Department, E. I. du Pont de Nemours Co.,

Wilmington, Delaware

THE PARTICIPATION of engineers in national defense is not only a reality but a challenge to every professional engineer. The advancing and changing technology in uncharted fields of our multi-billion-dollar defense program requires the best efforts of all engineers in Government, industry and education, and I am certain the challenge is being met daily.

During the period of February, 1955, to April, 1956, I was privileged to be a part of the Department of Defense, serving as Director of Construction in the Office of the Assistant Secretary of Defense for Property Installations under Assistant Secretary Franklin G. Floete, and for a period as Acting Assistant Secretary of Defense for Properties and Installations, reporting to Deputy Secretary of Defense, Reuben B. Robertson, Jr. To one whose professional experience has been in the chemical industry with the du Pont Company, this assignment in the Department of Defense was indeed a change and a challenge. The experience and observations obtained pointed up to me the ever-increasing need for more engineers to participate in our governmental and defense efforts. This participation may be through direct employment with the Government or by employment by contractors, sub-contractors, research organizations, educational institutions, and manufacturers. All have an important part in building the framework of our defense.

The engineer in Government is doing an excellent job. He obtains a personal satisfaction in working for the good of the country in its ever-increasing and changing program. The engineer in industry and education is likewise contributing in an outstanding manner. To obtain the ultimate results in the shortest practical time, there must be a further blending of the experience of the Government career engineer and the industrial and academic engineer.

Many people look upon the engineer in Government as performing only administrative duties, paper shuffling, and programming. This is not true. It is true that the administration involving programming, evaluation, scheduling, and budgeting is an important element in any program; however, this administration is only a part of the Government engineer's contribution. There are many other responsible assignments requiring the ultimate in technical creativity, initiative, and precision operation of defense facilities. Typical of the career engineers' assignments in Government are those to be found in the Office of the Secretary of Defense, and departments of the Army, Navy, and Air Force. These duties are divided between civilian and military personnel. On the staff of the Secretary of Defense, engineers and scientists are engaged in establishing policy and administration of research and development, applications engineering, supply and logistics, and properties and installations activities.

The programs of these offices include research and development on guided missiles and other weapons, on applications of atomic energy, fuels, vehicles, aircraft, metallurgy and clothing. Applications engineering involves the effective operation and maintenance of material, products, and facilities to perform a specific mission at a reasonable cost. Supply and logistic responsibility entails standardization of material, storage and distribution of petroleum products, designation and procurement of machine tools and strategic materials for defense, and procurement procedures. Properties and installations activities involve programming and evaluating military construction, real estate, housing, and maintenance of buildings and grounds; preparation of practical design criteria involving effective use of space and construction materials to provide the required life and low maintenance of facilities for specific missions; and the collection and proper interpretation of construction costs. The maintenance of properties and facilities alone presents a tre-

Professional engineers at the front in Korea. Snow and bitter cold could not halt vital construction programs.

Part of a materials production plant at Machinato, Okinawa. The power sub-station is in the foreground.

mendous challenge to the ingenuity and persistency of engineers to attain a proper balance between maintenance, plant investment, and cost of operation.

Activity in the Army, Navy, and Air Force ranges from research and development on guided missiles, supersonic aircraft, and atomic-powered ships and aircraft to the development, design, programming, construction, and operation of facilities and material all over the world. Programs of this nature require engineers in varied fields: research, development, design, evaluation, construction, operation, safety, and maintenance. Many outstanding contributions to the engineering profession, both military and civil, have originated from engineers in our military services and the record continues at an accelerated rate.

The engineers in industry are contributing new technology and products through research, development, design, construction, and manufacture. Often, this contribution is not recognized, but it is, nevertheless, an important ingredient in the end result. The engineer in the laboratory or in a manufacturing plant is contributing just as importantly as the ever-publicized scientist in the glamour areas of research and development for guided missiles and aircraft. It is just as essential that our armed forces have adequate clothing, food, and shelter as it is to have the best in transportation, weapons, and communication. The equipment, products and facilities resulting from the day-to-day efforts of the engineer in industry automatically become available to the military program.

To obtain the most advanced technical, practical, economical, and timely product for our military forces, it is necessary that engineers, both in Government and industry, continue meticulously to estimate, evaluate and schedule their projects and products. Safety provisions both for personnel and material, and cost reduction features are a never-ending challenge.

TYPICAL of the teamwork in our defense program is the formation and execution of the Military Construction Program. This world-wide effort involves the generation, conception, programming, estimating, evaluation, approval, legislative action, and financial budgeting of a world-wide construction program in the magnitude of two billion dollars. The participants in the effort include military personnel, civilian engineers in Government and industry, members of the House of Representatives and the Senate, the Bureau of the Budget and the President of the United States. Under authority vested by the National Security Act of 1947 as amended and by Reorganization Plan No. 6 of 1953, the Secretary of Defense (Charles E. Wilson, Secretary; Reuben B. Robertson, Jr., Deputy Secretary) is responsible for direct surveillance over the planning and construction, by the military departments, of all military public works construction projects. Under this authority, the Assistant Secretary of Defense, Properties and Installations (Floyd S. Bryant), has been delegated the responsibility of providing the Secretary of Defense with a continuing review of the military construction programs and of developing, strictly from a staff and policy viewpoint, effective plans, policies, procedures, and systems for use by the military departments. The responsibilities of the Assistant Secretary of Defense (Properties and Installations) in the Construction Field are discharged by the Director of Construction (Edward J. Sheridan—John Heard, Assistant). The Director of Construction is responsible through the Assistant Secretary of Defense (Properties and Installations) for all phases of military public works construction from original planning, through design and construction, to final completion. He develops policies and systems for, and exercises surveillance for the Department of Defense in the field of construction of production facilities, family housing, buildings, ports, bases, and all other forms of installations, including facilities and installations necessary for the administration and training of the reserve forces (National Guard of the United States, Air National Guard, Army Reserve, Naval and Marine Corps Reserve and Air Force Reserve). Specifically, the responsibilities of the Director of Construction include:

(1) Development of uniform design criteria and construction standards for the military departments.

(2) Promulgation of basic instructions and program guidance for the preparation of all military public works programs.

(3) Review and correlation of the yearly public works construction programs to determine the validity of requirements and to assure economy of construction.

(4) Submission of these annual programs to the committees of Congress for authorization and the support of the program through testimony.

(5) Research and analysis to improve existing design criteria and construction standards through engineering and architectural review.

(6) Policy guidance in long-range planning and mobilization planning.

(7) Post-authorization and post-appropriation determinations as required to permit orderly and efficient accomplishment of the program.

(8) Surveillance of construction programming and progress.

The development schedule for the Military Construction Program entails an intensive two-year effort and is based on the military requirements set forth by policies of the Joint Chiefs of Staff. The program starts at the local installation of the military organization with the local engineering groups of the military specifying, estimating, and evaluating construction requirements. Civilian engineers and architects assist by preparing detailed plans, specifications, and estimates. Local planning boards of the Army, Navy, and Air Force review and approve the program at

the local installation and field or area commands, then submit recommendations to headquarters where the requirements are further reviewed, any adjustments made, and approved for further action. It is at this stage that the program is submitted to the Office of the Assistant Secretary of Defense (Properties and Installations) for review and approval by the Director of Construction, the Comptroller, and the Bureau of the Budget. During these reviews adjustments are made to the program and upon concurrence of responsible agencies, the program is submitted for Presidential and Congressional action. This action requires detailed presentation of the projects or line items to the Armed Services Committee of the House and Senate. The program is correlated by the Office of the Assistant Secretary of Defense (Properties and Installations); however, the detailed presentation and support is made by the engineering and operations staffs of the Army, Navy and Air Force. Upon the approval of the Armed Services Committee, a bill is prepared for action of the House and Senate. Upon approval of the bill, authorization for the construction is enacted by law. The financial appropriation for the construction authorization follows a similar pattern through the appropriation committees of the House and Senate.

DURING THE REVIEW and analysis of the individual projects or line items, consideration is given to the need of the project in the over-all program, the requirements for additional land, the coordination and concurrences of interested groups in the Department of Defense such as Research and Development, Supply and Logistics, Applications Engineering, Manpower Personnel and Reserve, Health and Medical, and Comptroller, and the relative urgency when compared with other requirements. The projects are reviewed as to how they fit into the master plan of the installation, the economics and types of design recommended, and most importantly, the degree of accuracy of the financial estimate. If we are to obtain our construction requirements economically and on time, it is readily realized that all of these steps require participation, ingenuity, and detailed evaluation by qualified engineers in the Government, both military and civilian, and engineers and architects from industry.

CONTRACTING for the construction phases of the program is prosecuted by lump sum contracts, on a competitive bid basis, through one of the established defense construction agencies of the Army Corps of Engineers or the Navy Bureau of Yards and Docks. The Air Force construction program is normally handled by the Army Corps of Engineers or the Navy Bureau of Yards and Docks; however, there are exceptions to this policy, particularly for facilities involving research and development.

The enabling legislation for the construction program to provide facilities for the several reserve components is P.L. 783 (81st Congress), subsequently amended by P.L. 302 (84th Congress) to provide total authorization in the amount of $500 million, effective through the period ending June 30, 1958. The allocation of the total authorization to the several reserve elements is determined by the Secretary of Defense, after consultation with the armed services committees of Congress. The FY 1956 construction program, totalling $108 million, is indicative of the types of training facilities provided.

National Guard of the U. S.: Construction of armories and non-armory projects such as warehouses, shops, and rifle ranges. The Federal Government contributes seventy-five per cent of the cost of Armory Projects. The state share is twenty-five per cent, exclusive of real estate and site improvements, which are also state responsibilities.

Buildings for Air Force men stationed on the Greenland Polar Ice Cap are actually 18-foot tubes with interconnected passageways.

Air National Guard: Construction of airfield facilities such as pavements, hangars, and other facilities.
Army Reserve: Construction of armories, warehouses, shop, training facilities. The U. S. Government supports all costs.
Naval and Marine Corps Reserve: Construction for facilities to implement flight and ground training.
Air Force Reserve: Construction for flying facilities such as airfield pavements and technical support facilities.

The development of design criteria and construction standards is a coordinated program with the three military departments to insure uniform, adequate facilities with reasonable maintenance at economical cost. These standards and criteria encompass such features as space allowances, quality of frame and shell, quality of interior finishes, plumbing fixture allowances, and general structural, electrical, mechanical, and fire-protection requirements. Instructions on establishing standards and criteria for permanent construction of the principal repetitive-type facilities have been published and are in effect. These standards apply to such facilities as barracks, bachelor officer quarters, mess facilities, administrative facilities,

(*Continued on page* 50)

Foundations for new permanent type barracks at Fort Hood, Texas, are shown. Each of the buildings is designed to house 225 men.

Engineering Employment Practices Digest

A short digest of a monthly bulletin published by the National Society of Professional Engineers in the interest of advancing cooperative relations between professional engineers and their employers. To regularly receive the complete publication which is distributed widely to industrial, commercial and educational organizations, write the NSPE, 2029 K St., N.W., Washington 6, D. C.

✓ **The National Labor Relations Board has filed its reply in the pending court action which challenges the Board's interpretation of the professional provisions of the Taft-Hartley Act holding that it can include a few nonprofessionals in professional voting units. In a recent case at the Buffalo plant of Westinghouse, the NLRB added nine nonprofessional employees to a voting group of 233 professionals within the labor law definition as found by the Board. This action has now been challenged in the District of Columbia court as an illegal application of the law.**

In its defense brief, the NLRB contends that it may "blend" the professional provision with other provisions of the law, and that the separate election right given professional employees is intended to apply only where the proposal is to include professionals in a more numerous group of nonprofessionals. Although the Board officially found the nine employees to be "nonprofessional," their brief refers to them as "semi-professionals," a term which does not appear in the law.

* * * * *

✓ *The NSPE "Criteria For Professional Employment of Engineers" has received wide notice in the engineering press and has been reproduced in full, or in part, by a number of employment relations services. Many companies have ordered quantity copies for distribution to executives and engineering personnel. See inside back cover for further information about the content of the Criteria and quantity prices.*

* * * * *

✓ **Nathan I. Hall, Vice-President, Hughes Aircraft Company, recently told a group of executives that "what the engineer really wants," is interesting work and lots of it. He said that while money is quite important, it is not the complete answer to holding engineers. Hall stressed the importance of keeping engineers adequately informed and suggested that ways be found to promote deserving engineers without waiting for vacancies to open up by establishing more No. 2 or No. 3 positions with appropriate titles. The aircraft executive also warned against neglecting the engineer who makes an important technical contribution and said that advancement should not depend upon supervisory responsibility only. Physical accommodations are most important, Hall said, noting that the engineer will find it difficult to be proud of his company "if he is stuffed into a large barn-like area with his desk in a row of 100 others." Creative work is best performed in offices containing not more than four people, Hall said.**

* * * * *

✓ The Aircraft Industries Association has issued a policy statement which disapproves of the "pirating" of engineers and declares that companies should not hamper their employees in searching for new jobs. The AIA denied that it had ever condoned so-called "gentlemen's agreements" which prevent an employee from obtaining a job in another company in the same field without clearance of the present employer. A recent report of a congressional committee deplored the undue costs to the government for the recruitment of engineers due to the high rate of attrition among engineering personnel.

* * * * *

✓ *The National Industrial Conference Board, 460 Park Ave., New York 22, has published "Engineering Union Contracts," analyzing sixteen collective bargaining agreements between major employers of engineers and engineering unions. A companion volume, "Unionization Among American Engineers," will be published soon. It will include the NSPE Criteria in full.*

* * * * *

✓ **A six-state classification study of engineering personnel in highway departments discloses that of 2,114 employees classified as engineers, only 31 per cent were registered, and only 35 per cent were civil engineering graduates . . . A related study suggests that much needs to be done to shift many duties from engineers to engineering aides, clerical and administrative employees . . . An analysis of engineering grads at the University of Detroit discloses that 67% took their first job in pursuance of a career plan. The opportunity to do graduate work was a major reason for selecting their first employer for ten per cent of the group. Average starting salary for the grads was $452 and it is indicated that the 1957 figure will be $500.**

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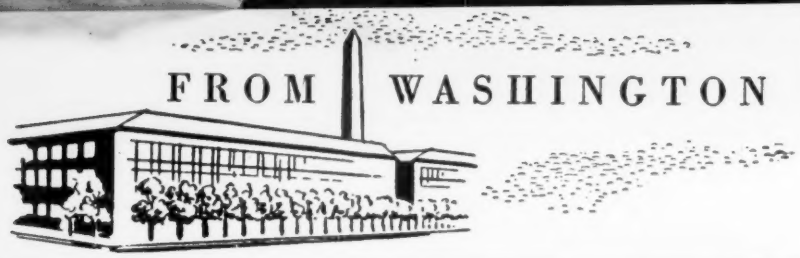


By
Milton F. Lunch.
N.S.P.E.'s Legislative Analyst

ENGINEERING GOVERNMENT PROGRAMS: PRIVATE CONSULTANTS OR FEDERAL EMPLOYEES?

SINCE the beginning of this government there has existed the question of how to handle the nation's public business as between regular full-time public employees and the utilization of experts and consultants in specialized fields of endeavor as the need arose. In recent years as government became more deeply involved in a multitude of affairs, including highly specialized problems of a technical nature, the question has received renewed attention. To place this point in perspective, it may be noted that the Federal Government now is the largest employer in the world, and it is engaged, at least to some extent, in practically every major phase of industry, education, science, and finance.

Private practitioners in professional fields, such as engineering, have been particularly sensitive to the idea of the Federal Government adding to its permanent staff the necessary personnel to furnish the technical professional services required by new programs and expanded activities of the Federal agencies. NSPE policy on this point declares that technical assistance "should be furnished in all cases by qualified individual practitioners, and in the field of engineering by professional engineers registered under appropriate state engineering registration laws." The statement adds that "where the Federal Government has any proper function in technical assistance or development, it should be through the administration and supervision of such funds as may be made available for the procurement of the services of private individuals or organizations."

Rep. William L. Dawson of Illinois

Shortly before the recent session of Congress adjourned there were two pertinent developments on this subject, one dealing with a general study of the employment and utilization of experts and consultants, and the other involving legislation favoring a greater use of private consulting engineers in a Federally-supported program.

The over-all study was made by the House Committee on Government Operations, under the chairmanship of Rep. William L. Dawson of Illinois. Although much of the study and report dealt with legal problems encountered in the employment of part-time consultants and experts, and with the "conflict of interest" problem about which so much has been heard lately, the Dawson group seems to draw a basic line between temporary employment of individual experts for highly specialized tasks, and the growing use of firms or organizations under contract on a lump sum basis for a particular job. In the first instance, the Committee feels that the use of individual experts on a per diem basis is praiseworthy because "career employees' exclusive devotion to public service is not always conducive to their keeping abreast with modern business methods and procedures." Engineers and scientists would appear to receive a general "clean bill of health" from the Dawson group as they note that "the problems of abuse relate to so-called experts and consultants outside the scientific or technical area." Of the approximately 6,000 new appointments a year of experts and consultants, the majority are scientific or technical specialists.

In the case of contracting with firms or organizations, however, the Committee declares that "the injudicious use of the contract device for the procurement of such services can result in evasion of the civil-service laws and the Classification Act." They declare that "it is often more expensive, particularly since there is generally no limitation upon the amount of money which may be paid to firms and organizations of experts and consultants, as distinguished from individuals."

The Committee recommends that all existing authority for the utilization of experts and consultants be brought into one statute, and that the Civil Service Commission be given central authority to regulate the employment of experts and consultants. Another recommendation particularly pertinent to engineers and scientists favors more uniformity in compensation to correct a situation in which

(Please turn the page)

highly competent experts sometimes receive less per diem rates than those of lesser qualification.

The related Congressional action in this subject came just before adjournment in the form of an amendment to the Watershed Protection and Flood Prevention Act. This statute, adopted in 1954, was designed to permit full development of all land and water resources as an integral part of a watershed soil conservation and flood and sediment control program. The amendment permits the inclusion, in reservoirs constructed for flood and sediment detention, of capacity for municipal and industrial water supplies as well as regulatory capacity for irrigation and other beneficial purposes which are consistent with the basic purpose of flood and sediment control, and authorizes the Federal Government to make loans to local organizations to assist them in financing their share of the cost.

In connection with the latter authority, Congress added the provision that when structures are for municipal or industrial water supplies, the local organization (state, political subdivisions of states, soil or water conservation districts, flood prevention or control districts, etc.) *must* employ non-Federal professional engineers for design, preparation of contracts and specifications, awarding of contracts, and supervision of construction. When projects are for flood prevention or for agricultural water management, the local organization has the option of employing non-Federal engineers or using the technical services available from the Soil Conservation Service. If the local organization employs private professional engineers for this work the Federal Government reimburses it for the services, and the Secretary of Agriculture may advance to the local organization up to five per cent of the total cost of the works of improvement for this service.

An amendment to the Watershed Protection and Floor Prevention Act deals with the use of Federal engineers and private consultants on certain Government water and soil management projects.

The Senate Committee on Public Works explained its reasoning on the alternative procedure as follows: "The committee is of the opinion that the local organizations should make the fullest practicable use of available and qualified professional engineers and it is believed that where appropriate under the act as amended, the local organizations should be advanced funds to pay for such services. The committee recognizes that the current shortage of engineers, both within and without the Government, make it essential that the local organizations and the Department of Agriculture have latitude to meet the conditions experienced in many states and localities with respect to the availability of engineering services."

This language suggests several interesting points. First, the Congressional intent is to have local organizations receiving Federal funds for engineering projects use private consulting engineers to the fullest possible extent instead of Federally-employed engineers. Second, the "shortage" is a two-edge sword and in this instance accounts for the decision not to require the use of private consulting engineers in all cases.

The statutory language reads that when the local organization retains a professional engineer, either in the mandatory or optional situation, the professional engineer or engineers shall be "satisfactory to the Secretary," and if the local organization decides not to retain a professional engineer in the optional situation "or if the Secretary determines that *competent* engineering services are not available he may contract for a *competent* engineer . . ."

The Soil Conservation Service is now drafting regulations to implement these provisions, as well as others. The obvious question is how the regulations will treat the matter of engineers' competence and satisfaction in the eyes of the Secretary. Will registration under state law be required in all cases, and will any registered engineer automatically be considered competent and satisfactory based on the approval of his technical qualifications by a state registration board? The Soil Conservation Service officials have indicated a willingness to discuss these points and others with representatives of NSPE before the regulations are finally adopted.

At the moment it is clear, in any event, that Congress has recognized the desirability of using private consulting engineers, and has again recognized the status and importance of "professional" engineers in contrast to previous legislative acts which made reference to "engineers" without the important professional designation.

The Engineer As Citizen

By

MORRIS L. COOKE, P.E.,

Consulting Engineer,

Philadelphia, Penna.

We are engineers and as such hold a position of peculiar trust and responsibility in connection with the progress of a complex civilization. We touch on every hand problems of life and destiny in which we must take some part.

—William F. Durand
Past President of the American Society of Mechanical Engineers and Emeritus Professor of Mechanical Engineering at Stanford University.

—Photo by Mosler Safe Co.

Through NBC television the nation gets its first mass look at the Declaration of Independence, the Bill of Rights, and the Constitution. Good citizenship should be a prime concern throughout life, the author points out.

AT HIS INSTALLATION as president of Rutgers University, Lewis Webster Jones said, "The universities must now put first the education of young men and women as persons and citizens, recognizing that their training as competent technicians is necessary but of secondary importance." Here Dr. Jones put his finger on three important phases in the training of engineers as all-round people.

Now let us take a look at what is actually happening in these three quite distinct areas of engineering education. In the first place it can be freely admitted that our engineering schools, utilizing the rapidly increasing stock of scientific and technical knowledge, and aided by a wide variety of engineering societies, are doing a pretty fair job in providing for the technological side of an engineer's equipment. As bearing on Dr. Jones' reference to "persons," certainly progress has been made in recent years in the development of the cultural side of a standard engineering education. This has been due largely to the influence of a recommendation first formally made over twenty years ago by the Wickenden Commission, and later endorsed by Engineers' Council for Professional Development through its accrediting procedures. Both agencies suggest that at least twenty per cent of curricular time be devoted to non-engineering subjects of a cultural type likely to broaden the engineer's outlook and to enrich his personal life by acquainting him, as Matthew Arnold expressed it, "With the best that has been known and said in the world, and thus with the history of the human spirit." Let it be admitted that really to illumine engineering curricula as recommended is no easy task. Simply to add non-engineering subjects without a reasonable expectation that they will broaden understanding and enrich the outlook has already been proven to be only a sacrifice of hours previously devoted to technical training. To accomplish any satisfying result may take years of trial and error. A significant and nation-wide effort toward this end has been too long delayed.

To lengthen the normal four-year engineering course to five years, to demand a pre-engineering arts course, and to make engineering a graduate course are suggestions seemingly too radical to be considered at this time for general adoption.

But, vastly important as it is, next to nothing has been done by the engineering profession, through the schools which train engineers, or through our engineering societies, to activate Dr. Jones' insistence that the technically trained be at the same time full-fledged citizens. In *Engineering, a Creative Profession*, published a few years ago and widely advertised by E.C.P.D., and its predecessor pamphlet, *Engineering as a Career*, published earlier, no mention is made of the engineer's civic responsibilities other than those involved in being a good technician. This situation results in a measure from a curious conviction on the part of many of those educating engineers that the study of the so-called humanities, even when conducted under ideal auspices, includes all necessary recognition of the engineer's civic responsibility.

WHILE VOTING at elections has come to be recognized as a prime responsibility of educated people, the effect of a single vote in a national electorate must necessarily be minimal. Similarly, while the social service rendered by any one engineer may easily be of limited importance, social service on a profession-wide basis would undoubtedly be a mighty force in human affairs. There is no intention in what follows to discuss how we engineers are

meeting the test of non-technical civic interest by comparison with what is being done by other professions. The discussion is on the opportunity and responsibility of our own profession.

The assumption is commonly made by doctors, lawyers, economists, engineers, and other professionals—who, by the way, are apt to be among our most highly schooled people—that good work in their own technical specialties absolves them from any responsibility for what goes on in other sectors of our far-flung society. This attitude becomes more and more baneful as our specialties become narrower and deeper. Any professional is apt to evaluate as his most significant rating that accorded by those practicing in the same specialty. This is assumed to be the master test for professional accomplishment and

Above: A new building for the University of Pennsylvania. The author says that study of the humanities alone is not enough to become a full-fledged citizen.

arrival. As narrowing and deepening specialization goes forward by leaps and bounds, what happens within the intervening and widening interstices of the social order becomes more and more accidental. Therefore, over wide areas of human interest what happens benefits not at all by the good offices of those who should be the best qualified to lend a guiding hand. In these haphazard and uncontrolled circumstances the illiterate, the overly ambitious, and the blatantly crooked are apt to call the tune. We cannot afford to *assume* the continuance of our democracy with its priceless liberty. Survival requires conscious and devoted effort at all levels, and by all groups, constituting the American public.

Here are some typical matters among thousands which cry out for non-technical and non-official attention from the lay public. On the domestic front: slum clearance, soil conservation, control of stream pollution, education at all levels, strengthening government and making it clean, civil liberties, agencies for safeguarding and advancing the moral standards of our national life, and a hundred and one other local community enterprises such as hospitals and health clinics, homes for the aged or infirm, boys' clubs, YMCA, symphony orchestras, and recreation centers. And internationally we citizen engineers should stand with the growing number and variety of agencies that struggle for better relations between peoples and states, and that further relentlessly pursue the attack on world-wide poverty and low living standards. That aid to backward peoples is not all technical or governmental was recently illustrated through the sending by airplane under National Council of Churches auspices from Columbus, Ohio, to Iran, of 30,000 New Hampshire Red baby chicks. The movement for the exchange of students between this and foreign countries carried on under scores of different auspices, many of them non-governmental, is becoming a great force for the betterment of human and international relations.

As a large percentage of our profession "work for the Government"—as much as fifty per cent in ASCE—we should have in mind that public employment is not necessarily synonymous with social-mindedness. The acceptance by engineers of invitations to sit on non-engineering or quasi-engineering boards and commissions, either public or private, can and perhaps usually does, tend to broaden the understanding between our specialized field and that which lies outside. But the master result will be achieved only when the individual engineer and our engineering organizations have learned to promote socially minded activities on their own initiative—when to think beyond the narrow technical confines of engineering has become second nature.

Of course the claim is often made by professional people, including engineers, that when adequate time and attention are devoted to their technical pursuits, no time is left for lay endeavor. All history and all philosophy appear to question this point of view. Leadership and arrival seem to depend upon broadening both the outlook and the activities. It took Elton Mayo to teach the management engineers the significance in the study of shop operations of what he called "the total situation." The same outlook in a broader field is suggested by the word ecology, only recently receiving common acceptance, as indicating the necessity for going far afield in the study of nature and its ways.[1]

As over eighty-six per cent of all engineers are employees,[2] it would seem highly important that as early as possible in their education they should receive specific grounding in the essential qualities of the public interest as contrasted with those definitely private, and at times anti-social, considerations which are part and parcel of our so-called free enterprise system. Accepting certain principles and practices as being innately and timelessly either right or wrong, and assuming that they provide the basic foundations for all conduct under the democratic process, it would seem desirable that the rules for our day-to-day guidance in such matters should be evolved through the long-time and wide-scale thinking of the citizenry generally, rather than be handed down on occasion by any then-dominant top leadership, either in Government, the college world, or in private enterprise. Thus civic and ethical disobedience on proper occasions is implied if the engineering group's claim to professional status is to be justified.

Since adult engineers as a rule find it difficult to serve in the less conspicuous capacities of the social service, the ultimate achievement of our goal seems to lie in seeing to it that the start be made in high school and college days. Even the simplest of social welfare assignments will begin

[1] See *A Sand County Almanac* by Aldo Leopold, Oxford University Press.

[2] The percentage of those having employee status among doctors and lawyers is negligible. Even when they are on a salary basis, the character of their employment is rarely such as to affect their practicing in accord with professional standards.

to make the evolving engineer recognize himself as a member of society and not simply as a highly skilled technician. Under Carnegie Corporation financing, Teachers College of Columbia University has made substantial progress in taking the study of civics and the practice of public service into a large percentage of our high schools.[1] Seemingly this system without material change could be extended to cover at least the undergraduate years in engineering schools.

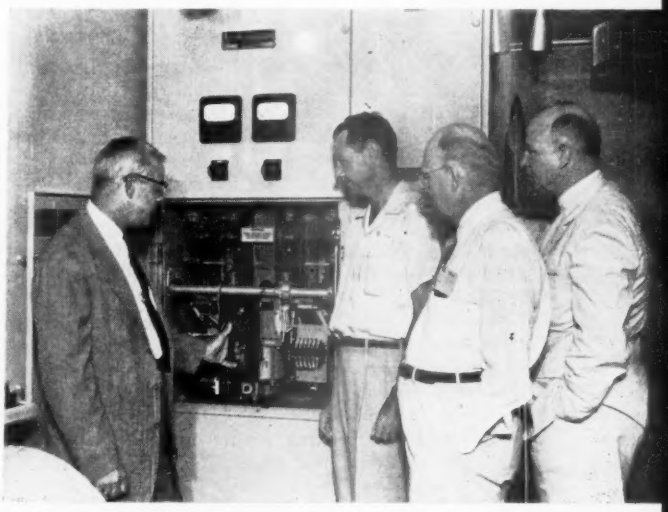
SOME liberal arts schools and colleges are already using teachers' influence in leading their pupils' activity into various lines of community service. Goddard College at Plainfield, Vermont; Parsons College at Fairfield, Iowa; Illinois College at Jacksonville, Illinois; the University of Kentucky at Lexington; St. Francis Xavier College at Antigonish, Nova Scotia; are a few among many colleges which have stressed community development in their curricula. In some instances the development of student thinking has been the motivating consideration. In others a sense of responsibility for the community in which the college is located accounts for the interest. Facility in community service cannot be acquired solely through "book learning." There must be practical experience. Even four years of intense extracurricular activities cannot take the place of public service off the campus.

The broadening of the interests of adult engineers would be encouraged if the effort were made to have frequently on the program of engineering meetings some spokesman for a non-engineering discipline, beginning perhaps with economists and other such professionals whose work at least impinges on the engineering field.

When engineers discuss civic responsibilities, they usually have in mind holding elective public offices. Of course that involves getting into politics, and "politics is rotten" according to the normal engineering point of view. We have some rotten politics, just as we have some crooked business. There is too much of both. Society provides jails for offenders. But this is really testimony as to its health—not at all an admission that the social fabric is honey-combed with evil. So, to admit a percentage of graft in politics and of crookedness in business, is to face facts, rather than to damn our political and business systems or to give aid and comfort to the guilty. To say that "all politics is rotten" not only gets us nowhere, but it is not true—and further, it is a thoroughly demoralizing cliché. If crookedness comes our way, let us try to "scotch" it. But let us not permit the fact that there are crooks, to lend too much color to our lives. That is what the crooks in government and industry would have us do. It is terribly anti-social. Emphasize the fine things rather than the drab ones—not because it is either pleasant or tactful to do so, but because it is the formula by which the race has always gained new heights.

THERE ARE at least two ways by which one enters the political field. Either some top man, or so-called "boss," taps you on the shoulder and suggests that you run for some political position, or — and vastly preferable — through a gradually widening interest in socially minded service of the public, seeking or accepting a political post becomes a natural. This was apparently the route by which Herbert Hoover became President of the U.S.A. and ASME members Thomas E. Millsop and Raymond R. Tucker became mayors of their home cities.

As a matter of fact, both engineers and scientists tend to become a bit resentful when taken to task for not seeming to carry their fair share of the responsibility for affairs, domestic and foreign, lying outside their strictly professional domains. This is because each of us has engineering acquaintances who display an active concern for the poor and the aged, or for some phase of public education, or who struggle to make the public service more efficient and to free it from dishonesty. But statistically speaking, how general is this community-mindedness among engineers? No one can tell. It has been suggested from time to time that questionnaires be sent out to a representative number of the members of our large engineering societies, not only to find out what public services are now being rendered, but also to awaken interest in increasing the volume of this type of activity within the profession. In the absence of any statistical data reflecting either the participation by engineers in public affairs or the public's recognition of the value of such services, the author has had recourse to sources of information not designed to be so used.



Outstanding technical careers can be combined with outside interests. Here NSPE president and community leader R. J. Rhinehart, P.E., second from right, looks over a circuit breaker with other electrical engineers.

For instance, a review of several programs of the American Forum, the Georgetown University Forum, Youth Wants to Know, and the New York Times Youth Forum, and one year of America's Town Meeting of the Air, reveals surprisingly few speakers or members of panels who could be identified as engineers.

Of 522 appearances of American citizens in these enterprises only 13 are of our profession. On the other hand, there were 134 lawyers, 116 educators, 75 journalists and authors, 56 business men, 26 doctors, 21 scientists, 20 economists, and 16 clergymen among those distinguished names.[1] The truth of the matter seems to be that engineers are not trained for the hurly-burly of public discussion and by virtue of that fact live lives all but detached from the pulsating non-technical world. In the opinion of one

[1] See *Reader's Digest*, August 1953.

[1] There were 45 other names of persons who could be identified in *Who's Who* or other biographical compendia. They include actors, artists, musicians, politicians, labor executives, diplomats, architects, and farmers. Certain overlaps exist between education and the other professions listed as educators. If educators were engineers, lawyers, economists or doctors, they were classified under these professions rather than as educators.

distinguished member of our profession,' engineers do not "sound off" enough. Even in engineering proceedings informal discussion is all but unknown. The fact that an engineer is assumed to possess what he considers to be the revelant data before expressing an opinion precludes "sounding off." And yet, as the *Charlotte News* (Charlotte, N. C.) recently observed, "'Sounding off' is one of America's finest democratic exercises. Don't ever let it wither away."

IN AN ANALYSIS by profession of the members of the present Congress — 84th First Session — made by the Library of Congress Legislative Service, one member of the Senate and one member of the House are listed as engineers—this out of a total of 531.[2]

In the 1950-51 issue of "*Who's Who in America*" (the last volume for which a vocational index has been provided) there are listed about 1100 engineers who in their correspondence with *Who's Who* asked for this designation. In some minds these particular engineers would be rated as the very top echelon of American engineering. There are in the U.S.A. about 400,000 men and women calling themselves engineers or actively practising in the field. So it is admittedly difficult to appraise the significance of the listing in *Who's Who* of less than three tenths of one per cent of this total, no matter how meticulously the selections might have been made. Neither as to engineers, nor as to any other classification, appearing in this highly esteemed publication, have norms been set up which being met insure the inclusion in its lists of any given individual.

In order to see how those listed appraised themselves, both as to their engineering accomplishments and otherwise, I have had 110 (a ten per cent pilot study of those 1100 persons who listed themselves as engineers) of these biographies analyzed. They were chosen quite at random from good-sized cities and small towns located in the eastern part of the United States, the Middle West, and the Far West. *Who's Who* assures me that the questionnaire sent to those whose listing is under consideration specifically asks for details of civic and related activities. The biographical sketches prepared from these data always include mention of these non-engineering activities themselves and/or the top position held in connection with them.

In making this analysis I have omitted all military service and membership in social organizations such as the Masons, Shriners, Elks, American Legion and Knights of Columbus, as well as in academies, foundations, associations, institutes, and societies where dues-paying signifies the interest.

Without claiming anything approaching mathematical accuracy, among the 110 names of these supposedly outstanding engineers, there were found 30 with a clear record of some community service, whether confined to a single line such as "Boy Scout work" or of a more varied type.

But among these same 110 names there were found 69—or almost two thirds—who, while giving a more or less detailed account of their technical work, made virtually no mention of any community activity or interest. The remaining 11 names among the 110 constituted a median group either not indicating any continuing interest in community activities; or showing solely an interest in business associations such as chambers of commerce; or indicating an isolated public activity extending over a short period such as occasional service as arbitrator under national or state arbitration agencies. It is significant that only one of these 110 rather conspicuous engineers mentioned any social interest or activity international in character.

THE ENGINEER, if he wills it, can be the master builder in the civilization that will eventually emerge from the flux and chaos of the present day. But this can happen only as the engineer takes on a social-mindedness which makes him see his specialized technical task as only a part of the total picture—a part having thrilling quality and proportion. Engineering, to seize its marvelous opportunity, must get out of the glorified gadget, materialistic, and separatist stage and become a towering part of humanity's incessant struggle for plenty, for peace, and for spiritual values. "Engineers must be alert to world conditions and have a thorough understanding of mankind's hopes and aspirations" was part of a statement made recently by T. Carr Forrest, Jr., past president of the National Society of Professional Engineers.

Even for such voluntary, and usually uncompensated, civic service an apprenticeship is required. As C. S. Mackenzie said in his Roy V. Wright (ASME) lecture, we must outgrow the well-nigh universal attitude among engineers that by virtue of their training they can serve acceptably in a wide range of public causes without preliminary practice on the lower rungs of the public-service ladder. There is a "feel" both in the governmental and the non-governmental services of the people quite different from that normal to employment for hire in private enterprise.

"The answer (to the engineer's social problem) is not easy but very simple" are words used by William Faulkner to describe a somewhat comparable situation. Our goal would appear to be development to the point where the largest possible percentage of professional engineers have what might be called civic cum laude status. This means that they will have had a hand—and one involving some sacrifice in time, leisure, and possibly money—in one or more community activities either local or gauged to some one state or the nation, or possibly international in scope.

The engineer's blueprint is an ever more widely used device. But it must bespeak socially conscious and spiritual content to assure to our profession of engineering a dominant position in the evolving civilization.—***End.***

[1] "The Engineer and His Civic Duty," Roy V. Wright lecture, by R. R. Tucker, Mayor of St. Louis, member ASME, at ASME semi-annual meeting, Pittsburgh, June 1954.

[2] In many instances members of Congress list more than one occupation. In this listing there were used the ones on which the stress was laid by the MC providing the data.

About the Author . . .

M. L. Cooke

Morris Llewellyn Cooke has had a distinguished career as an engineer and high government official. Armed with a degree in Mechanical Engineering from Lehigh University he served in several technical capacities while developing a keen interest in public affairs. This interest led to his appointment as Director of Public Works in Philadelphia.

Later he returned to his consulting engineering practice but with the coming of the Roosevelt Administrations he was often called upon to take important offices in fields that frequently made use of his engineering background. He became the first Administrator of the Rural Electrification Administration. Then he headed several groups to take active steps to conserve the nation's soil and water. He represented the United States in the adjudication of the Mexican oil dispute.

During World War II he was chairman of the Shipbuilding Stabilization Committee and then headed a technical mission to Brazil. Later President Truman appointed him chairman of the President's Water Resources Policy Commission.

Mr. Cooke is a Fellow, American Society of Mechanical Engineers, and a registered engineer in the State of Pennsylvania.

NEW Processes . . .

Sprayed Steel Aids In Development of All-Aluminum Engine

A wear-resistant coat of metal, thinner than a sheet of blotter paper, has removed a major roadblock in the development of America's first practical all-aluminum engine.

Aluminum Company of America, cooperating with Metallizing Engineering Company, Inc., of Westbury, N. Y., says a highly wear-resistant coating of sprayed steel on aluminum cylinder walls opens new horizons to designers of the lighter-than-ever all-aluminum engine.

Alcoa engineers, testing fully loaded aluminum internal combustion engines for hundreds of hours, found the serviceability of both aluminum pistons and the steel-sprayed aluminum cylinder surfaces superior to similar components of a conventional engine.

The conventional aluminum piston, long standard in automotive and heavy-duty industrial engines, admittedly does not function well bearing directly on an aluminum cylinder wall. It does, however, work smoothly on a ferrous alloy surface. This hard steel-sprayed face does the job with wear to spare.

The need for special slotted pistons, or pistons fitted with expansion control devices, will probably be outmoded because the aluminum piston will have an expansion ratio exactly equal to the aluminum cylinder. The thin coat of steel does not affect the expansion of aluminum.

Recent successes are the result of the unprecedented adhesion between the steel bearing surface and the aluminum cylinder achieved by Metco's patented "Sprabond" process. This technique requires a super-thin layer of pure molybdenum between the aluminum and steel to serve as a bonding material. There is no longer a need for mechanical anchorage of the sprayed steel to the aluminum cylinder.

Although the all-aluminum engine is not a new idea, the sprayed steel bearing surface should accelerate its development.

Internal Movements of Engines Photographed by Stroboradiography

A General Electric-Detroit Arsenal engineering team has achieved the near-incredible feat of making motion pictures of the innards of an engine while it is running.

The job involves taking X-ray pictures of the spinning, throbbing internal movements of the engine through its steel housing, and visually "stopping" with a camera their high-speed motion.

The new technique, called stroboradiography, could have a significant effect on engineering design. Slow-motion X-ray movies and still pictures of pistons, cams and other moving parts have enabled engineers to scrutinize, for the first time, complete cycles of engine operation for faulty performance or wear.

The revolutionary process gives designers their first glimpse inside a completed machine operating at normal speed under load conditions. Improved, light-weight designs, and perhaps important basic design changes could result from the X-ray motion studies.

The special stroboradiographic equipment was developed by the General Electric Company for use with its high-energy industrial X-ray betatron, operating at 5 million to 15 million volts. The company's General Engineering Laboratory in Schenectady, N. Y., developed the equipment in cooperation with Detroit Arsenal and the General Electric X-Ray Department in Milwaukee.

Unlike conventional X-ray equipment, the betatron furnishes the surging radiation pulses—416 per second—that have given engineers this unprecedented "inside" view of any deflections, vibrations or bouncings inside a running machine.

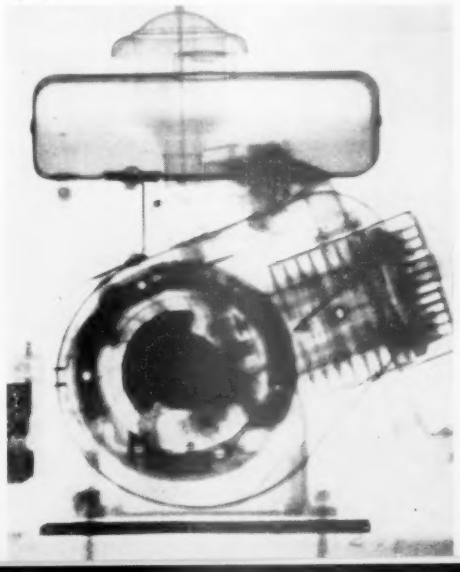
The new process involves taking thousands of short exposures accurately synchronized with the moving part. With an exposure time of 10 to 15 millionths of a second, it is possible to radiograph an engine turning at several thousand revolutions a minute.

A synchronizing disc attached to the specimen engine signals the betatron and releases the surge of electrons that make the split-second X-ray exposure. Several thousand repetitions result in a strong image clear enough to be analyzed for operational data.

The superimpositions form the picture on special film that receives the filtered X-rays after they have passed through the specimen.

Raymond A. Pulk, chief of the Detroit Arsenal's Materials Laboratory who conceived the idea of adapting the betatron to this concept, explained the strobographic process this way:

"Flashing a short X-ray pulse in the same predetermined phase of the engine cycle gives an infinitesimally small action per cycle on the X-ray film, but the superimposition of several thousand of these pulses makes the engine appear to be standing perfectly still when actually it is operating at several thousand revolutions a minute."



The inner secrets of a running engine have been exposed in this pioneer X-ray picture, the result of a new stroboradiographic technique developed by the General Electric Company in cooperation with the Detroit Arsenal. Using radiation pulses of a 5-to-15 - million - volt betatron and special strobographic equipment, engineers now can get slow-motion and stop-motion photos through the engine block and cylinder walls of a running engine.

EW Film Available; Kits Ready

A 16mm color film entitled *American Engineer* will be available without cost to all NSPE chapters for showing during National Engineers' Week, February 17-23, 1957.

The 29-minute film was produced by the Jam Handy Organization for General Motors and it is designed as a tribute to the accomplishments of American engineers.

The National Society has arranged to have 300 prints of this film reserved for use during National Engineers' Week. Any chapter may reserve the film for the Week by writing to the Jam Handy Organization, 2821 East Grand Boulevard, Detroit 11, Michigan.

American Engineer will be shown at NSPE's fall meeting in White Sulphur Springs, West Virginia. John L. Bahr, National Engineers' Week chairman, will introduce the film after the banquet on Friday evening, October 26.

"I have seen the film," Mr. Bahr stated, "and I thoroughly recommend it for use during the 1957 National Engineers' Week. It is a genuine tribute to professional engineers in all fields, and the great things they have accomplished in this country. I believe we are quite fortunate to have this new film available to us without cost."

Some of the engineering highlights shown in the film are:

First atomic powered submarine.

Radio telescopes receiving ultrashort-wave radio sounds from the sun and the stars.

Airborne uranium hunters, working from helicopters.

World's fastest ocean liner.

Electron microscope magnifying a molecule.

Biggest open pit copper mine in the world.

Television-telephone for tomorrow.

Architecture for tomorrow.

Longest open-water bridge.

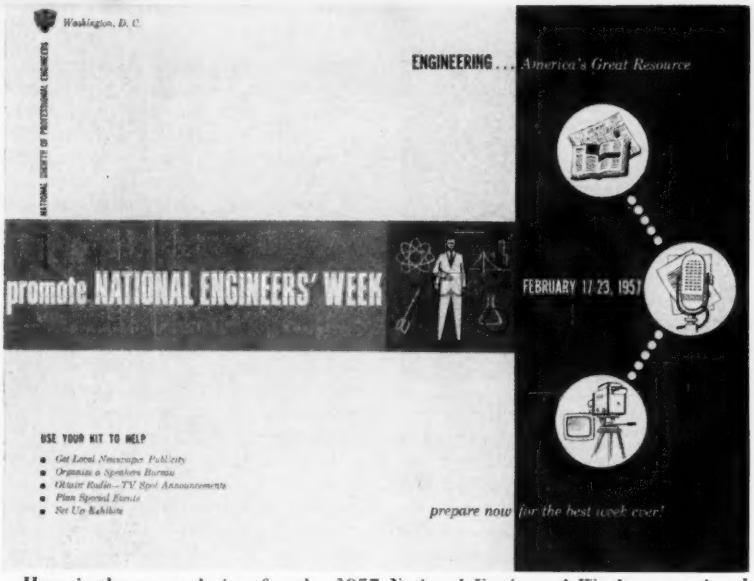
The film is particularly appropriate for illustrating the 1957 theme, "Engineering . . . America's Great Resource." It can be shown at chapter meetings, youth guidance conferences, and at other affairs with a general audience.

In other Engineer's Week planning activity, Mr. Bahr announced that the promotional kits will be mailed on or about October 15. The kits will contain suggestions for developing a basic program for the Week. They will be sent to all chapters and state societies.

Material describing the radio, television, and other promotional aids available from the National Society will also be sent to all chapters and state societies. A complete description of these aids will appear in the November issue of the AMERICAN ENGINEER. These aids include large and small posters, paper banners, newspaper mat stories, metal logotypes and gummed seals. A 15-minute tape recorded program for radio, and a set of six films for TV will also be available from the National Society, along with a set of TV slides.

Chairman Bahr stated that a special effort would be made this year to get the 1957 poster design into newspaper and magazine advertisements. This is being handled at the national level by the mailing of the metal logotypes, carrying the poster design, to a large number of industrial advertisers. "Chapters can aid in this project by ordering the logotypes from the National Society and sending them to house organs and other locally published magazines in their mem-

American Engineer, a 29-minute color film, will be available to all NSPE chapters during National Engineers' Week, February 17-23, 1957.


Washington, D. C.
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS
ENGINEERING . . . America's Great Resource
promote NATIONAL ENGINEERS' WEEK
FEBRUARY 17-23, 1957
USE YOUR KIT TO HELP
Get Local Newspaper Publicity
Organize a Speakers Bureau
Obtain Radio-TV Spot Announcements
Plan Special Events
Set Up Exhibits
prepare now for the best week ever!

Here is the cover design for the 1957 National Engineers' Week promotional kits. The kits will be mailed to all NSPE affiliates during October.

bership area," Mr. Bahr said.

A new item in the kit this year will be a reproduction of the poster design on glossy paper. This reproduction, six inches deep, can be photographed by any newspaper or magazine engraving department for use in the publication. It may be reduced to six inches in size, or blown up to twelve inches. Additional copies of the reproduction may be obtained free from the National Society.

A mailing to a list of more than 500 industrial engineering executives has been made on a letterhead containing the National Engineers' Week sponsors' names. This mailing consisted of personally addressed letters from Chairman Bahr explaining the purposes of the Week, and asking for industry-wide cooperation in the observance. A return address post card to the National Society was included. Executives returning the card will be sent descriptive material on the promotional aids available.

Chairman Bahr urged that local chapters and state societies organize their Engineers' Week committees as soon as possible. "The reports from previous years indicate that early committee organization is one of the things generally found where successful Engineers' Week programs have been held," he said.

Eleven outstanding engineering figures have consented to act as sponsors for the 1957 National Engineers' Week. Personally addressed letters on stationery carrying the sponsors' names have been sent to approximately 600 industrial executives, and 800 publishers of daily newspapers. The letters described the purposes of the Week, and asked for cooperation with local projects during the observance.

Here are the sponsors of National Engineers' Week, February 17-23, 1957:

VANNEVAR BUSH
Former President
Carnegie Institution of Washington

ALLEN B. DuMONT
Chairman of the Board
Allen B. DuMont Laboratories, Inc.

CHARLES F. KETTERING
General Motors Corporation

JAMES R. KILLIAN, JR.
President
Massachusetts Institute of Technology

CLARENCE H. LINDER
Vice President
General Electric Company

THOMAS E. MURRAY
Commissioner
United States Atomic Energy Commission

ROYAL W. SORENSEN
California Institute of Technology

PHILIP SPORN
President
American Gas and Electric Company

DAVID B. STEINMAN
Consulting Engineer

CHARLES ALLEN THOMAS
President
Monsanto Chemical Company

ROBERT E. WILSON
Chairman of the Board
Standard Oil Company of Indiana

November Young Engineers' Month

Material will shortly be mailed out from the headquarters of the National Society to state and chapter presidents containing suggestive steps in organizing a program for Young Engineers' Month to be held in November.

As a result of action taken at NSPE's annual meeting in Atlantic City, N. J., the month of November was designated as Young Engineers' Month in an effort to stimulate the interest of junior engineers and young professional engineers.

R. C. Clark Passes

Richard C. Clark, a national director of NSPE from Wisconsin, died recently of cancer at the University Hospital, Minneapolis.

At the time of his death, Mr. Clark, 58, was district engineer at Superior for the Wisconsin Highway Department. For thirty years he was assistant district engineer at La Crosse, leaving in January, 1955, to take over the engineer's duties at Superior.

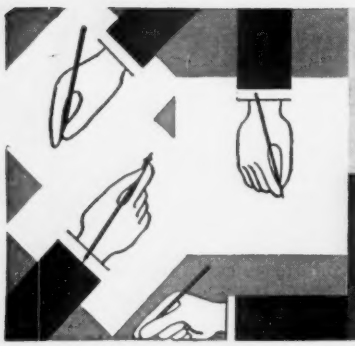
Richard C. Clark

Born in Albany, Wis., Feb. 25, 1898, he attended Albany schools and was graduated from the School of Engineering at the University of Wisconsin.

He was elected president of the Wisconsin Society of Professional Engineers at its Milwaukee convention in 1952. In 1948 and 1949 he had served as a director of that organization, and was second vice president in 1950 and 1951 and first vice president in 1951 and 1952.

He was a Navy veteran of World War I.

He is survived by one daughter, Patricia, of Rockledge, Fla.; one brother, William M., of Belleview, Wis., and one sister, Mrs. H. L. Fricke, of Sheboygan, Wis.



Professional POSTSCRIPTS

Hello, again! The fall season is the reading season so we hope that this issue of the AE will find you with renewed interest for Postscripts and many other features in the magazine.

Tired of stories about the engineering profession in Russia? We wouldn't blame you if you were, but we do feel that what follows here is worth your attention. It is an edited article from *Photographic Engineering* based upon an address by Wesley V. Hurley, Deputy for Programs, Office of the Assistant Secretary of the Air Force. There's a lot of "food for thought" in this one and our hats are off to Engineer C. W. Fromm of New York City for sending it along to us.

—PP—

THE U.S.S.R. has become known as a suppressor of individualism and the progenitor of collectivism. It has adhered to these policies from the collectivization of farming down through the present day declarations against the "cult of the individual" and the promotion of the new "collective leadership." The United States, on the other hand, has always stood for reliance on the individual and the preservation of individual freedom. Against this back-drop, it is most interesting to examine some of the working techniques used in each country to further the progress of air technology.

Looking first at the Soviet Union, we are somewhat surprised to find a number of individualistic procedures in force. One of the most obvious of these is the incentive and award system for individual performance which stimulates the scientist or engineer to significant achievement.

This incentive system is a force throughout the entire scientific or engineering career. State scholarships for university enrollments are offered automatically only to "gold medalists," the straight A graduates of the secondary schools. Those with B's in minor subjects, and all others, are admitted on a rigid competitive examination basis. Once enrolled, failure to pass in two subjects results in automatic dismissal. Passing grades, on the other hand, result in a 1/3 increase in the scholarship stipend, while honor grades bring an additional 25% increase. Upon graduation, engineering and science students step into the third highest pay category in the Soviet Union and are eligible throughout the remainder of their career for various bonuses or awards for superior performance.

Through the receipt of a number of awards and the other benefits accorded top Soviet engineers and scientists, a number of these men have become the Russian equivalent of the American millionaire. The aircraft designer, Sergei Vladimirovich Ilyushin, has received two Stalin prizes and the Order of Lenin three times. Each of these awards generally carries a stipend of 100,000 to 150,000 rubles. Mikulin, the engine designer, has won four such prizes. One should note, in passing, that for persons of responsibility the system includes certain negative awards. Serious failures have, in the past, brought swift retribution from the State.

A second noticeable symptom of individualistic "free-enterprise" activity is the high degree of competition in the Soviet aeronautical industry. Several design bureaus are generally involved in design competitions for new equipment before a final selection for development. In the case of aircraft, this decision is made by the Council of Ministers. In some areas this initial design process is far more competitive than its American counterpart.

Although the collectivist ideal is that of a number of different people all doing the same thing, it is rather startling to find that the Soviet research and development complex appears knit together and activated by a few rather remarkable individuals, each of whom do a number of different things.

One such is Dr. Boris Yuriev, author of over 200 technical papers on applied aerodynamics. As Vice President of the Soviet Academy of Science, he exerts a profound influence on the over-all direction of the national research and development effort. As Minister of Higher Education for all Soviet engineering academies, he has been instrumental in attaining the present high quality and large scale production of Soviet scientists and engineers. As Deputy Director for Science at the Zhukovsky Air Engineering Academy and member of the technical council of the Central Aerohydrodynamics Institute, he directly influences certain key research and development programs.

General Andrei Tupolev, generally regarded as the co-founder of Soviet aviation and Dean of Soviet bomber designers, is a professor, a member of the Academy of Scientists and Chief of his own design bureau (which has been responsible for, among other things, the new Soviet jet transport).

Turning now to the United States, it is somewhat discouraging to find that it is we who appear to be leading the way in developing the collective approach to technology. While this technical collectivism is manifested in a great many ways, I shall discuss . . . but four:

a. The mass approach to technical problems wherein the problem is literally trampled into submission by the laying on of hordes of scientists, engineers, engineering aides, computing machines, and complicated test equipment.

b. The substitution of a plodding systematic approach by so-called "teams" of workers for individual judgment, ingenuity, and technical artistry.

c. The development of tortuously systematic management procedures for control of the resources with which the individual must work.

d. The making and review of technical and managerial decisions by countless boards, committees, and *ad hoc* working groups.

The first of these, the mass approach to technical problems, is extensively used nowadays. There are, of course, conditions under which it should be used; but its use is certainly far more prevalent than are these conditions. A typical example, presently at hand, is that of a particular aircraft currently in development. With this airplane, as with other aircraft over the last 20 or 30 years, the problem exists of developing the means of keeping rain off the windshield during take-off and landing. The manufacturer's approach to this problem is about as follows:

Some 6 months was spent in determining the statistical distribution of the droplet size of genuine rain. After this, a full scale model of the forward portion of the fuselage was placed in a windtunnel. The windshield had been marked off in Cartesian coordinates and motion picture cameras installed behind each portion. This complex set-up is now being "rained" on in the windtunnel with artificial rain (of the proper droplet size) under simulated take-off and landing conditions. From the resulting motion picture records, engineers are busy determining the percentage of windshield area swept clean by each device tried and the relative importance of that area to the pilot's total field of vision. In a few more months a satisfactory technique for keeping the windshield clear will undoubtedly be obtained. However, in what I am fondly coming to look upon as "the good old days," one promising young engineer with a piece of plate glass and a garden hose would have achieved the same result in a few weeks. Moreover, if he were particularly ingenious, he would by that time have developed a theoretic or semi-empirical formulation of the principles involved, which could be used in further windshield design. Instead, the approach now being pursued is likely to result only in a solution for that particularly windshield.

The second type of technical collectivism, where individual ingenuity and judgment is replaced by groups using prescribed procedures, is a far more insidious development which almost seems intrinsically involved with the advancing technology itself. It has been described as the substitution for individual genius by trained mediocrity. The end objective of fully developed systematic solutions to technical problems is to enable larger numbers of less competent people to solve problems which could earlier be solved only by more creative people. Unfortunately, in each problem there is a residue of artistry and judgment which must be supplied by the problem solver and which is generally not present in those using the procedures developed.

A. N. Whitehead once described a "system" as a product of rational intelligence. However, he went on to say that "once the necessary procedures have been developed, intelligence vanishes and the work proceeds by the coordination of conditioned reflexes." This type of conditioned reflex activity is not likely to lead to technological breakthroughs. In addition, it is often more lengthy and expensive. Some years ago I worked for a man who was a genuine engineering artist at designing turbines. Within the space of a half-hour, he could sketch out an airfoil cross section, which was the best that could be obtained, and the last turbine which he personally designed is, to my knowledge, not yet surpassed in over-all efficiency. Today, this man has been replaced by a group of PhD's, baccalaureates, engineering assistants, a room full of computers and access to ENIAC. This agglomeration also designs turbines. It takes longer and costs more—and the product isn't as good. Moreover, new engineers coming into the field learn only the systematic procedures and not the creative artistry; so that no new designers of the older types are being developed.

Analogously, systematic management procedures have been widely developed over the past decade. For many years managerial and administrative red tape was a proprietary secret of the Government but the secret has leaked to private enterprise; and we, in government, are being clearly surpassed by industry in the art of laying on the dead hand of management. In many cases, government operations are remarkably streamlined by comparison. The growth of systematic management procedures has been augmented by the development of so-called management principles which are then taught in the schools so that any idiot can learn how to manage. The consequences are obvious.

A creative friend of mine who had averaged about 3 patents a year over a 40 year working span retired some 3 years ago from a well known company. He stated that managerial control over his resources had become so severe in his last few working years that it had become almost impossible to do anything. He cited as an example his attempt to have a one foot section of 10 inch pipe welded on to another pipe so that he could run an inexpensive, but significant, test.

He had gone through the first step in the newly established procedure, which consisted of writing up a justification which explained the purpose of the job, the work to be done, and target dates, etc. Having set this afloat in the administrative system, and three months having passed without action, he began tracking through the wilderness to ascertain what had happened. He found that his request had come first to a committee which met regularly to pass on all new capital investments in the plant. They had duly approved the new plant investment of an additional one foot length of pipe and had turned the job over to a junior engineer in the facilities engineering division. He in turn had rewritten the original justification into a request on the drafting room to produce a drawing and an estimate of the material and labor cost. This having been accomplished, the information had been returned to the facilities engineer, who was at that time in the process of writing up a specification for the job and a request for bids. At this point, my engineering friend killed the project out of kindness, but had it been aggressively pursued, it may have taken only another 3 months to complete. As little as 6 or 7 years ago in the same plant it was only necessary to go in to the pipe shop, select pipe from the pipe rack, and ask a pipe fitter to perform the required task. This was usually done in less than 4 hours and the testing completed in another 4.

Such managerial control of resources as that described is usually established for good reason and originally intended to apply only to certain categories of work. However, once established, such controls are applied indiscriminately and inevitably result in the stifling of much creative activity.

The security of the world may well hinge on our ability to maintain the lead in this technical race. To do this, we must somehow learn again to rely on the individual creative genius of the American scientist and engineer, for he is the key to the whole matter.

Virginia Society of Professional Engineers—Annual Meeting, October 18-20, 1956, The Chamberlain Hotel, Old Point Comfort, Va.

NSPE Fall Meeting — October 25-26, 1956, The Greenbrier, White Sulphur Springs, W. Va.

West Virginia Society of Professional Engineers—Annual Meeting, October 25-27, 1956. The Greenbrier, White Sulphur Springs, W. Va.

North Dakota Society of Professional Engineers—Annual Meeting, November 2-3, 1956, Grand Forks, N. D.

Puerto Rico Society of Professional Engineers—Annual Meeting, November 24, 1956, Puerto Rico Institute of Engineers Building, San Juan, Puerto Rico.

NSPE Spring Meeting—February 15-16, 1957, Hotel Fort Sumter, Charleston, South Carolina.

NSPE Annual Meeting — June 6-8, 1957, Statler Hotel, Dallas, Texas.

N.S.P.E.

Believes

THE IMPORTANCE OF THE BOARD OF DIRECTORS

BY PAUL H. ROBBINS, P.E.

Executive Director

N.S.P.E.

THE NSPE Constitution stipulates that "The Board of Directors shall determine all questions of policy and shall administer the affairs of the National Society under this Constitution." This is indeed broad terminology. As in most Constitutions, of course, there is a further spelling out of ground rules under which the Board shall operate; and with a similarity to the Federal Constitution, certain autonomous rights are reserved to the state societies and local chapters.

Nevertheless, this broad responsibility makes membership on the Board of Directors both a challenge and an opportunity to those professional engineers designated by the states to serve in this important capacity. NSPE believes the responsibilities of each member of the Board of Directors can be grouped into three major areas.

Two of these are spelled out in the above-quoted section of the Constitution. First is to determine policy for the Society. Since the area of activity of the professional society is exclusively in the professional aspects of engineering, these policies, of course, have broad impact upon the future development of the profession. The Society has grown to such an extent that it is, of course, impossible for each member of the Board, as it is for each member of the Federal Congress, to be thoroughly familiar with all aspects and ramifications of the many professional problems of engineering. It is good administration, therefore, that there should be committees of the Society whose responsibility it is to delve in more depth with respect to the various questions of professional development. It is these committees who present their reports for the consideration of the Board. Much thought and discussion precedes each committee report, and of necessity they must be reduced to only the most salient points. Nevertheless, each of the three meetings a year of the Board has a considerable volume of material which must be carefully considered by the Board members. The policy of NSPE is to send these committee reports to each Board member in advance of the meeting in order that he may have an opportunity to carefully weigh the presentations and recommended policy and actions of the Society before being called upon to cast his vote.

The second function of the Board is likewise stipulated in the Constitution; namely, to administer the Society. This, too, is becoming an increasingly complex problem as the Society grows in numbers, in affiliated state societies and number of local chapters. The finances of the Society alone have increased nearly ten-fold in the last fifteen years, and a major concern of the Board is its responsibility to see that the dues paid by each member are spent to the mutual benefit of the profession, the member and the Society.

A third responsibility, however, not stipulated in the Constitution, but in which NSPE believes deeply, is the responsibility of the national director to serve to the greatest degree possible as a line of communication both between the state society and the national organization and the national organization and the state society and its local chapters.

Undoubtedly one of the most perplexing problems of any organization is the problem of transmitting information. The national director is always a member of the board of directors of the state society. It is his responsibility to absorb as extensively as possible the thinking and the philosophy of his state society, for he is the means by which another fundamental tenet of NSPE philosophy is accomplished; namely, that the policies and activities of the national organization are stimulated and implemented as the result of the wishes of the members expressed through their representatives at the state society and national levels. The accumulation of this nation-wide thinking represented by the NSPE Board of Directors cannot help but result in policies of benefit to the professional engineers and the membership of the Society. Likewise, once a policy has been so extensively screened and has received the approval of the Board, it is the director's responsibility to bring the discussions which have ensued back to the state board of directors, and to the greatest degree possible directly to the chapter officers and membership. These same responsibilities exist for the directors from the chapters who make up the board of directors of our state societies.

The men who make up the National Board of Directors are dedicated professional engineers. They have served their chapters and state societies over the years. They are continuing their service by accepting the extensive responsibilities of national directors. As individual members of the Society, we owe a deep debt of gratitude to these altruistic individuals whose primary motivation is to make a better engineering profession.

NATIONAL BOARD OF DIRECTORS–1956-57

J. A. McLennan
Alabama

James O. Martin
Arizona

Leonard N. White
Arkansas

George E. Zelhart
California

Sam Hawkins
Colorado

P. W. Genovese
Connecticut

C. H. Evans
Delaware

Frank L. Martin
District of Columbia

John E. Kiker
Florida

Harvey F. Pierce
Florida

Alabama. J. A. McLennan, P.E., was born in Concord Junction, Mass., June 4, 1899. He received a B.S. in M.E. from the Alabama Polytechnic Institute in 1923, and an M.S. degree from the University of Colorado in 1938. He is a charter member of the Alabama SPE and served as its president in 1954. Mr. McLennan is manager of steam projects, Southern Services, Inc. He saw active military duty during World War I and World War II. During World War II he served in the Corps of Engineers in the North West Service Command and the Tenth Army. He is a member of the American Society of Mechanical Engineers and the Engineers Club of Birmingham.

Arizona. James O. Martin, P.E., was born in Ottawa, Ontario, Dominion of Canada, Feb. 21, 1905. He received a B.S. degree from Dartmouth College in 1925 and a C.E. degree from Thayer School of Engineering in 1926. He worked as an engineer and estimator with Adams & Ruxton Construction Co., Springfield, Massachusetts, 1926 to 1945 and as chief of operations with Del E. Webb Construction Co. of Phoenix, Arizona, 1946 to 1953. Until August of this year he was chief engineer with the J. R. Porter Construction Co. of Phoenix. He is now project manager of the Utah Construction Co., San Francisco, Calif. He has been active in the Central Chapter and in the Arizona SPE since its inception in 1948. Previously, he belonged to the Massachusetts SPE.

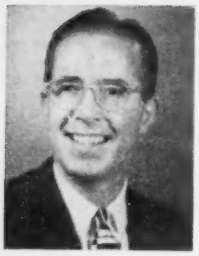
Arkansas. Leonard N. White, P.E., was born in Louisville, Kentucky, April 1, 1898. Attended Little Rock, Arkansas, public schools; graduated from University of Illinois in 1921 with B.S. degree in civil engineering. Engaged in consulting practice at Little Rock, Arkansas, as an assistant and later as a principal from 1921 until 1945 except for period of military service as major, C.E., during World War II. Served as engineer-director, Pulaski County Planning Board, Little Rock, Arkansas, for six years. Since 1951 he has been engineer for water resource activities with the Arkansas Geological and Conservation Commission. He is a past president and national director, Arkansas SPE; member Arkansas Engineer License Board; member ASCE; member Rotary Club, and active in civic and religious bodies.

California. George E. Zelhart, P.E., was born in Cedar County, Missouri, November 8, 1897. He attended Fresno Junior College, 1919-1921, and Stanford University. Since 1925 he has been employed by the Pacific Gas & Electric Company. Prior to that date he was employed by the Southern California Edison at Big Creek, California, and the Pacific Telephone and Telegraph Company in San Francisco. He was among the first to become a registered mechanical engineer in the State of California. He has been active in the Fresno Chapter and the California SPE, having served as president of the latter in 1953-54. He is active in the fraternal and civic groups of his community.

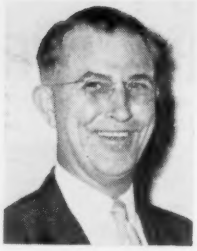
Co'orado. S. H. Hawkins, P.E., a native of Colorado, received his BSME degree from the University of Colorado in 1935 and has done extensive graduate work there, as well as at the University of Denver and Colorado State College. For thirteen years following graduation he was engaged in private practice, sales engineering, and construction engineering. Since 1948, he has been in charge of construction for District No. 1 of the Denver Public Schools. He is a charter member of the Professional Engineers of Colorado and has served that society in numerous official capacities, including a 1951 term as president. He is also active in Denver civic affairs.

Connecticut. Philip W. Genovese, P.E., was born in New Haven, Connecticut, January 22, 1917. He received a B.E. degree from Yale University in 1938. He now operates the consulting and design engineering firm of Philip W. Genovese & Associates in Connecticut, and is associated with S. Peter Shumavon of New York for highway work and work outside the State of Connecticut. Prior to the establishment of this firm, Mr. Genovese was a partner in the consulting and design engineering firm of Newman E. Argraves & Associates from 1949 to 1955, and in the firm of Argraves & Mort from 1946 to 1949. He was a lieutenant commander, C.E.C., U.S.N.R. during World War II, assigned to underground fuel storage and airfields in Hawaii and Florida. He has been active in the New Haven Chapter of the Connecticut Society of Professional Engineers and is a past president of both the New Haven Chapter and of the Connecticut SPE.

Delaware. Clarence H. Evans, P.E., was born in Aberdeen, South Dakota, September 30, 1906. He graduated from Georgia Tech in 1929 with a B.S. in Ch.E. In 1955, he attained his present position as senior consultant of the Chemical Engineering Section of the Engineering Dept. of E. I. du Pont de Nemours & Co., Inc., in Wilmington, Del. His professional career has been entirely with du Pont, including 11 years on engineering and supervision at 5 plants, 4 years in production supervision at 3 ordnance plants during World War II, and 12 years in the central engineering office in various supervisory positions. He



Felix E. de Golian
Georgia



Arley R. Walker
Georgia

W. P. Eaton
Idaho

C. W. Klassen
Illinois

W. W. Wallace
Illinois

L. Eugene Easley
Indiana

H. R. Veenstra
Iowa

Leland S. Hobson
Kansas

A. M. Gompf
Maryland

Joseph H. De Foe
Massachusetts

was a co-author of Chemical Engineers' Handbook, McGraw-Hill, 1950. He is a member of AIChE, AIME and many other technical societies and was president of Delaware Society of Professional Engineers, 1951-52. He has been active in civic affairs and currently is chairman of the Delaware State Board of Registration for Professional Engineers and Land Surveyors.

District of Columbia. Frank L. Martin, P.E., was born in Jersey City, N. J., on December 25, 1907. He attended New York University. Prior to 1935 when he entered the Federal Civil Service, he served as structural engineer in the New York and New England area with several outstanding construction companies. He was a partner in the now defunct firm of Moulton, Morrissey, Martin and Karr, consulting engineers, Washington, D. C. Since 1940, he has been with the U. S. Maritime Administration as structural engineer and naval architect, and is presently Chief, Construction Cost Analysis Branch in the Office of Ship Construction. He is a member of DCSPE since 1939, having served as secretary-treasurer, director and president while also being active in local church and civic groups.

Florida. John E. Kiker, Jr., P.E., was born in Americus, Georgia, April 26, 1906. He received an S.B. degree from M.I.T. and an M.C.E. from New York University. After five years of commercial laboratory practice, he spent four years in Indo-China, working for the Layne-New York Co., on the design, construction, and operation of water treatment plants. He also worked briefly in Venezuela on assignment with a consulting firm. From 1936-1947, he was district sanitary engineer with the New York State Department of Health in Poughkeepsie, with the exception of four years of World War II service, advancing to the rank of major and serving lastly as chief, Sanitary Engineering Section, Surgeon's Office, Seventh Service Command Headquarters, Omaha. Since 1947 he has been in charge of the Sanitary Engineering Section, Civil Engineering Department, University of Florida. He has held many chapter and state society offices and was president of the Florida SPE in 1953. He is a member of Sigma Xi, Sigma Tau, and other engineering societies, including the ASCE.

Florida. Harvey F. Pierce, P.E., was born in Apalachicola, Florida, October 18, 1909. He received a B.S. in E.E. from the University of Florida in 1932. Since 1946 he has been secretary-treasurer of the firm of Maurice H. Connell and Associates, Inc., consulting engineers in Miami, Florida. Prior to his association with this firm. Mr. Pierce was with the Florida Power and Light Company in West Palm Beach in 1932, then transferred to the Sales Engineering Department in Miami early in 1933, resigning to join Maurice H. Connell in the practice of engineering. He has been active in both the Miami Chapter and the Florida Engineering Society, having served as president of the latter, 1955-56. He is a member of Sigma Tau, Phi Kappa Phi, Phi Eta Sigma, other engineering societies including AIEE, the Kiwanis Club and various other civic groups.

Georgia. Felix E. deGolian, Jr., P.E., was born in New Orleans, La., Nov. 4, 1913. He studied at Georgia Tech and graduated from the U. S. Naval Academy in 1937, with a B.S. degree. Since 1939, he has been a member of the Golian Steel and Iron Co., Atlanta, and is now president of this company. His industrial career was interrupted for war service in destroyers which involved, as final assignment, command of the USS Flusser. He holds the Legion of Merit and Bronze Star Medals. Mr. deGolian is interested in poultry husbandry as well as structural engineering. He belongs to the Georgia Heart Association, the Atlanta Area Girl Scout Council and is a member of the Sigma Chi Fraternity.

Georgia. Arley R. Walker, P.E., was born in Seneca, South Carolina, April 22, 1899. He received a B.S. degree in mechanical and electrical engineering in 1920 from Clemson College. He has been with Westinghouse Electric Corporation for approximately 33 years, having served in various capacities and locations. He is now an application engineer handling industrial apparatus in Atlanta, Georgia. Mr. Walker has been very active in the Georgia Society of Professional Engineers. He was a member of the GSPE Organization Committee in 1944, has served on various society committees, and was treasurer for approximately eight years. He is also a member of the Georgia Engineering Society and a number of civic groups.

Idaho. W. Purdy Eaton, P.E., was born in Green River, Wyoming, October 30, 1898. He received a B.S. in civil engineering from the University of Idaho in 1924. His first four years of professional experience were gained with the U. S. Bureau of Reclamation, both in field and office on the King Hill, Boise, American Falls and Owyhee Projects in Idaho and Oregon. For the past twenty-nine years he has been associated with the Idaho State Department of Highways. He has served the Idaho Society of Professional Engineers as secretary for ten years. During World War II he was appointed a member of the Area Rent Control Advisory Board.

Illinois. Clarence W. Klassen, P.E., was born in Grand Rapids, Michigan, November 28, 1903. He received a B.S. from the University of Michigan. He has been employed by the Illinois State Department of Public Health since 1925, and has served as chief sanitary engineer of the Department since 1935, with the exception of three years when he served in the Army as chief sanitary engineer of the Eighth Service Command at Dallas, Texas. He is one of the members of the Ohio River Valley Water Sanitation Commission, and of the Council of Consultants of the National Sanitation Foundation. He has been active in the Illinois SPE and served as its president. He recently completed an assignment for the World Health Organization as a consultant to the British Colonial Government in connection with its sanitary developments in North Borneo.

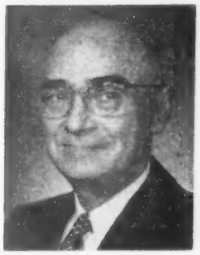
Illinois, W. Wayne Wallace, P.E., was born in Ontario, Wisconsin, February 9, 1901. He received a B.S. degree in C.E.

Walter J. Kreske
Massachusetts

Wesley Bintz
Michigan

Fred Cheek
Michigan

Lehmann M. Dunn
Michigan



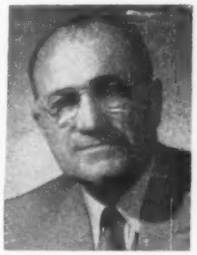
Carl K. Wirth
Michigan

Win L. Hindermann
Minnesota

J. J. Ryan
Minnesota

A. C. Miller
Mississippi

H. O. Croft
Missouri



A. V. Ferry
Missouri

from the University of Illinois in 1923. He has been associated with the Portland Cement Association 29 years; since 1944 as district engineer in charge of the Chicago office. He has been active in both the Chicago Chapter and the Illinois SPE, serving as president of the latter in 1943. He is a member of Tau Beta Pi, other engineering societies and various civic and fraternal groups.

Indiana. L. E. Easley, P.E., was born in Jerseyville, Ill., October 8, 1908. He was educated in public and technical schools at St. Louis, Mo. He was recently appointed manager of the Construction Division of W. H. Edwards Engineering Corporation, Indianapolis, with whom he was formerly associated in 1940 as a field engineer. He is also chief engineer. From 1940 to 1956 Mr. Easley was senior engineer in the plant engineer's office, Allison Division of General Motors at Indianapolis. From 1933 to 1939 he was employed in a supervisory capacity in the Construction & Engineering Dept., Montgomery Ward & Co., Chicago. He has been an active member of the Central Indiana Chapter for many years and was vice president of the Indiana Society in 1949-50 serving as its president in 1951, following which he has continuously served as national director. He is in *Who's Who in the Midwest*, a member of the Building Congress of Indiana, Indiana Engineering Council and is in *Who's Who in Engineering*. He is a Mason and member of various civic groups.

Iowa. H. Robert Veenstra, P.E., was born in Leighton, Iowa, and received his B.S. in civil engineering from Iowa State College in 1947. He holds the rank of captain in the United States Army Reserve, having served in the Pacific Theater of Operations during World War II. Since 1947 he has been with the consulting engineering firm of Stanley Engineering Company of Muscatine, Iowa, and Chicago, Illinois. He has been active in the Iowa Engineering Society and in the Muscatine Chapter of that Society. As a member of the Iowa Engineering Society, he served as chairman of the Unification Committee which put to a vote of the membership the matter of this group's affiliation with NSPE. He is a member of ASCE, AWWA and FSIWA, in addition to masonic and civic groups.

Kansas. Leland S. Hobson, P.E., was born in Kingman, Kansas, October 6, 1902. He received a B.S. in E.E. from Kansas State College in 1927. Since 1946 he has been a professor engaged in industrial management engineering at Kansas State College, and he has also been associate director of the Engineering Experiment Station since 1952. Professor Hobson was previously associated with the General Electric Company. He has had various offices in the Tri-Valley Chapter of the Kansas SPE, and has for three years been chairman of the Public Relations and Engineers' Week Committee for KSPE (now merged with and known as the Kansas Engineering Society). He has been elected to Sigma Tau, Sigma Xi, and Phi Kappa Phi, is president of the Kansas City Chapter of the Society for Advancement of Management, and is a member of the American Society for Engineering Education, and other engineering and industrial management groups.

Maryland. Arthur M. Gompf, P.E., was born in Pikesville, Maryland, in 1909. He was graduated from the Johns Hopkins University, School of Engineering. Mr. Gompf is president of Egli and Gompf, Inc. He is registered in Maryland, West Virginia and Washington, D. C. He has served as president of the Building Congress and Exchange of Baltimore, the Maryland Society of Professional Engineers, and the local chapter of the American Society of Mechanical Engineers. He is a member of the American Society of Heating and Ventilating Engineers and American Institute of Electrical Engineers. He is on the board of directors of the Progress Federal Savings and Loan Association and is active in various civic groups including Civitan.

Massachusetts. Joseph H. DeFoe, P.E., was born in Westboro, Massachusetts, October 2, 1895. He received his B.S. in C.E. from Tufts College in 1919. Since 1950 he has been director of the Board of Public Works in Wakefield, Mass. Prior to 1950 Mr. DeFoe occupied the following positions: Superintendent of Public Works for Lexington, Mass., 1945-1950; civil engineer with the Esso Standard Oil Company, Boston, Mass., 1943-1945; senior engineer with the Federal Public Housing Authority and the Federal Public Works Administration, 1933-1943; Superintendent of Construction, G. H. Cunningham & Sons Construction Company, Boston, Mass., 1930-1933, and Turner Construction Company, New York, 1920-1930. He is a member of the American Legion, Rotary and many engineering societies and public works associations.

Massachusetts. Walter J. Kreske, P.E., was born in Terryville, Conn., February 12, 1916. He received a B.S. in M.E. from the Massachusetts Institute of Technology in 1941 and an L.L.B. from the Harvard Law School in 1948. Since 1951 he has been in the practice of patent law and engineering consulting in Boston. Prior to that time, he has been employed with Raytheon Manufacturing Company as a patent attorney from 1949 to 1951, and doing engineering work for the Ordnance Department from 1941 to 1946. He is a member of the Boston Patent Law Association, Mass., Bar Association, a director of Magnitech, Inc., and president of the Newton East Little League.

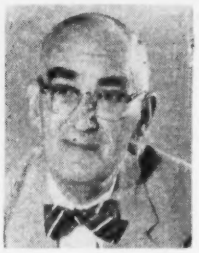
Michigan. Wesley Bintz, P.E., was born in Stanberry, Missouri, October 7, 1891. He graduated from the University of Michigan where he received his B.C.E. degree with second honors in 1916, and an M.S. degree in 1918. He spent five years in municipal work with the cities of Flint and Lansing, and since 1923 he has specialized in the design of swimming pools. During World War II, he worked for the Austin Company in the design of the Douglas Aircraft defense plant in Chicago and was in charge of the main assembly building. Following that he went to Detroit as secretary to the Mayor's Post-War Development Committee. He now lives in Lansing. Mr. Bintz is a past president of both the Michigan SPE and its Grand Valley Chapter. He is president of the newly-

H. W. Honefenger
Missouri

Clifford Dier
Nebraska

R. C. Barger
Nevada

Charles V. Bonhag
New Jersey



Curtis C. Colwell
New Jersey

Frank G. Manning
New Jersey

E. H. Wickland
New Jersey

A. B. Metzger
New Mexico

C. Arnold Dutton
New York

Anatole R. Gruehr
New York

formed National Swimming Pool Institute. He is vice president of the Lansing Chapter, National Exchange Club, and will assume the presidency in January. He is a member of the American Institute of Park Executives, and the National Recreation Association and the author of many articles dealing with his specialized engineering work. He is registered in 18 states and a province of Canada.

Michigan. Fred R. Cheek, P.E., was born in Alexandria, Ohio, May 23, 1911. He attended Otterbein College and Ohio State University. Since April, 1956, he has been director of public works and city engineer of St. Clair Shores. Prior to this employment, he was city engineer of Trenton, Michigan, from 1952 to 1955; and sanitary engineer, City of Dearborn, Michigan, from 1946 to 1952. He has been active in both the Detroit Chapter and the Michigan Society of Professional Engineers, having served as president of the Detroit Chapter in 1950. He is a member of the American Public Works Association and Federation of Sewerage and Industrial Wastes Association.

Michigan. Lehmann M. Dunn, P.E., was born in Port Huron, Michigan, March 1, 1914. He received a B.S. in C.E. from Michigan College of Mining and Technology in 1935. Since 1947 he has been owner of Dunn Construction Co. and Dunn Sales Enterprises. Prior to that he was employed by the U.S. Corps of Engineers, U.S. Bureau of Reclamation, Penn Iron Mining Co., and Steinle Wolfe, Inc. His military service included four years in SWPA during World War II. He is a Lt. Col. in the USAR. He is past president of the Michigan SPE, and a member in the Michigan Engineering Society, and Society of American Military Engineers. He is chairman of NSPE's National Defense Committee. He is also a member of Rotary International and active in Boy Scout and other civic work.

Michigan. Carl K. Wirth, P.E., was born in Monroe County, Michigan, September 18, 1891. He received a B.Ch.E. from the University of Michigan in 1913 and a M.S. from the same school in 1914, during which year he was elected to Sigma Xi. He is now director of special project engineering with Michigan Wisconsin Pipe Line Company, Detroit. Prior to this he was supervisor of Gas Section, Michigan Public Service Commission for over twenty years. He was general manager of the Missouri Industrial Gas Company, 1929 to 1932. He has been active in the Grand Valley Chapter as state director, and in the Michigan SPE as state treasurer for the past four years.

Minnesota. Win L. Hindermann, P.E., was born in Fairfax, Minnesota, September 24, 1907. He is an engineering graduate of the University of Minnesota where he received both a B.S. and an M.S. in civil engineering in 1927 and 1929 respectively. He had 22 years of service with the Minnesota State Highway Department, both in the laboratory and in the field. He was a bituminous engineer prior to his assignment as district maintenance engineer at Duluth, Minnesota. He left the latter in 1951 to accept a new position with The Asphalt Institute as its division engineer in the Midwest area. He holds the rank of lieutenant commander in the United States Naval Reserve, having served in Washington, D. C. and the Pacific during World War II. Mr. Hindermann has been active in both the Minneapolis and Duluth Chapters of the Minnesota SPE, having served as president of the latter in 1953. His technical memberships include the American Society of Civil Engineers, Asphalt Paving Technologists, American Road Builders Association, Highway Research Board, Military Engineers, and Sigma Xi.

Minnesota. James J. Ryan, P.E., was born in LeClaire, Iowa, November 27, 1903. He received a B.S. in M.E. from the State University of Iowa in 1925 and an M.E. from the same school in 1935. He joined Westinghouse Electric & Mfg. Co. at E. Pittsburgh, Pennsylvania, on the graduate student course and worked as mechanical research and development engineer in the Power Engineering Department. He obtained an M.S. in M.E. at the University of Pittsburgh in 1929. In 1931 he became a professor in the Mechanical Engineering Department of the Institute of Technology at the University of Minnesota. He worked toward an advanced degree at Stanford University in 1939-40. He is a member of several honorary fraternities including Tau Beta Pi. During his time at Minnesota, Professor Ryan has been consulting engineer to many of the industries in the Northwest. He has invented several recording instruments including the Flight Recorder developed by General Mills, Inc. He is author of a number of engineering papers published in the technical literature. A member of ASME since 1926, he also belongs to other scientific and educational societies. He has held most of the offices in the Capitol Chapter and state organization of the Minnesota SPE. He was president of the State Society during 1954-55.

Mississippi. Arthur C. Miller, P.E., was born in Brookland, Pennsylvania, April 25, 1911. He received a B.S. in sanitary engineering from Penn State University in 1931. Since 1942 he has been with the consulting engineering firm of Michael Baker, Jr., Inc., and has been a vice president of that firm since 1947 in charge of their Southern Division with headquarters at Jackson, Mississippi. Prior to his association with the Baker firm he was an engineer for the U. S. Forest Service from 1933 to 1942. He has been active in the Mississippi SPE for several years, and is a registered professional engineer in several states. Among his faternal memberships are Triangle, Pi Delta Epsilon and he is a Scottish Rite Mason. A member of ASCE, he now is serving as vice president of the Jackson Branch and belongs to several other technical and civic groups. He is now serving as chairman of the Board of Deacons of Fondren Presbyterian Church and is listed in *Who's Who in Engineering.*

Missouri. Huber O. Croft, P.E., was born in Denver, Colorado, in 1896. He holds a B.S. in mechanical engineering from the University of Colorado and an M.S. from the University of Illinois. Since 1949 he has been dean of the College of Engineer-

Harold A. Mosher
New York

George J. Nicastro
New York

Herbert F. Roemmele
New York

Edward P. Smith
New York

Leigh E. St. John
New York

Vincent G. Terenzio
New York

George S. Rawlins
North Carolina

E. J. Booth
North Dakota

Raymond A. Freese
Ohio

Ronald A. Gordon
Ohio

ing and director of the Experiment Station of the University of Missouri. Previously he was associated with the faculties of the State University of Iowa, Stanford University, and the University of Illinois. In addition to his activities in the Missouri SPE, Dean Croft is a past president of the Iowa Engineering Society and of the American Society for Engineering Education, and a member of the ASME, the American Rocket Society, Sigma Chi, Tau Beta Pi, and Sigma Xi, and many other professional and civic organizations. He has been awarded the Joint Army-Navy Citation for Civilian War Services.

Missouri. Arlow V. Ferry, P.E., was born at Sheldon, Missouri, January 28, 1898. He received a B.S. in C.E. from Missouri University in 1923. At the present time and for a period of 26 years he has been associated with Black & Veatch, consulting engineering firm of Kansas City, Missouri. From 1923 to 1928 he was an engineer with the Missouri State Highway Department. He has been active in both the Western Chapter and the Missouri Society of Professional Engineers. He is past president of the Western Chapter and present board member. He is present chairman of the M.S.P.E. Fees Committee. He is a member of A.S.C.E. and the Kansas City Engineers Club.

Missouri. Howard W. Honefenger, P.E., was born in Christian Count, Illinois, March 31, 1909. Received his degree in mechanical engineering from Washington University, St. Louis, Mo. Since 1936, he has been with the Elliott Company of Jeannette, Pennsylvania, and has been St. Louis district manager since 1947. His earlier experience has included work as a construction engineer with McClellan and Junkersfield, Inc., and Union Electric Co., during the construction of Cahokia Power Station and later with the contracting firm of Bilhorn, Bower and Peters, Inc. He is a charter member and past president of the St. Louis Chapter of the Missouri SPE and former state director of the later. He is a past director of the Engineers Club of St. Louis, a past member of the University City Council and City Planning Commission. He is currently active in the Boy Scouts of America and is president-elect of the MSPE.

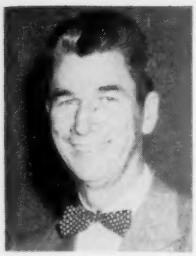
Nebraska. Clifford L. Dier, P.E., was born in Hastings, Nebraska, May 14, 1904. He received a B.S. in C.E. from the University of Nebraska in 1939. Since 1946 he has been a senior partner in the engineering firm of Harold Hoskins & Associates of Lincoln, Nebraska. He has been active in both the Southeast Chapter and the Nebraska SPE. He served in the U.S. Army from 1940 to 1946 and was released from active duty in 1946 as a colonel of infantry. He is active in the army reserve and is the current president of the Nebraska Department, ROA. He is a member of ASCE and ASTM, as well as masonic and civic groups.

Nevada. Richard C. Barger, P.E., of Henderson, Nevada, is the supervising engineer for the Stauffer Chemical Company's Nevada plant operation manufacturing heavy chemicals and insecticides. Mr. Barger has been associated with Stauffer Chemical since 1947. A native of Colorado, Mr. Barger was educated at Colorado School of Mines and Colorado University, served in the Air Force as an Instructor Pilot during World War II, and has been registered under the laws of the State of Nevada since 1951, in the branches of chemical and mechanical. Active in chapter and state activities, he has served through the offices of the Southern Nevada Chapter 1951 to 1954 and with the Nevada SPE since that time, completing his term of Nevada state president in 1955.

New Jersey. Charles V. Bonhag, P.E., a graduate of Newark College of Engineering, has been a consulting engineer and a partner in the Northeastern Engineering Company, an air conditioning contracting organization with offices in Paterson, N. J., since 1947. Prior to starting his own business he was a test equipment project engineer, and prior to that supervisor of production engine testing at Wright Aeronautical Corporation in Woodridge, N. J. He is past president of the Passaic County Society of Professional Engineers, past trustee for the Passaic Chapter in the New Jersey SPE, chairman of the State Committee on Ethics and Professional Practices and active on the Passaic Chapter College Scholarship Committee. He is active in various civic groups.

New Jersey. Curtis C. Colwell, P.E., was born in Buffalo, New York, March 18, 1889. He received a B.S. in C.E. from Carnegie Institute of Technology in 1912. Since 1944, he has been county engineer and supervisor of roads of the County of Essex, N. J., following 15 years as assistant county engineer. His early experience was with such companies as Turner Construction Company, E. I. du Pont de Nemours & Co., and the Lackawanna Railroad Company. He was a lieutenant in the Corps of Engineers, World War I. He is a past president of the New Jersey Association of County Engineers, and past president of the Essex County Society of Professional Engineers. He is deputy coordinator, Department of Civil Defense and Disaster Control, Essex County. He is a member of the ASCE, and of the American Public Works Association. He is active in numerous civic and veteran groups including the Caldwell-West Essex Kiwanis group, of which he is past president, and the American Legion.

New Jersey. Frank G. Manning, P.E., is a native of Jersey City, N. J. He received a B.S. in C.E. from Newark College of Engineering and an M.C.A. from New York University. Since 1950 he has been chief engineer, Department of Public Works, City of Jersey City. He is a consulting engineer with offices in Jersey City and is also consultant for the Jersey City Incinerator Authority. Mr. Manning was engineer for the Interstate Sanitation Commission from 1937 to 1950, except for service in World War II, Sanitary Corps, A.U.S., lieutenant to major. He is currently a member of the Executive Committee of New Jersey SPE, and is active in both the State Society and in the Hudson Chapter. This is his second year of a current two-year term as national director. He is also active in APHA, APWA, and various other engineering societies and civic groups.



C. R. Hanes
Ohio

Paul A. Harlamert
Ohio

W. F. Hilderbrand
Oklahoma

G. W. McCullough
Oklahoma

C. L. Kreidler
Pennsylvania

Robert Miller
Pennsylvania

Donald C. Peters
Pennsylvania

L. Foster Tierney
Pennsylvania

J. T. West, Jr.
Pennsylvania

Alberto Hernandez
Puerto Rico

New Jersey. Edward H. Wickland, Sr., P.E., was born in Camden, N. J., in 1907. He received a B.S. in E.E. from the University of Illinois in 1931. After brief service with the Trane Company and the Owens-Illinois Glass Company, he became affiliated with the E. I. du Pont de Nemours & Company, Wilmington, Delaware, in 1933. He has served as designer, senior project engineer and process engineer for the Du Pont Chambers Works Engineering Department located at Pennsgrove, New Jersey. He has been active in the Gloucester-Salem Engineering Society and the New Jersey SPE. Offices held in the former organization included the presidency. He is currently chairman of the Budget Committee and a member and past chairman of the NJSPE Engineer-in-Industry Committee. He has served for several years as a member of NSPE's Engineer-in-Industry Subcommittee and is a past chairman of this group. He has been a member of the NSPE Board of Directors intermittently since 1949. He has been active in local civic charity organizations.

New Mexico. A. Burton Metzger, P.E., was born in New York City, June 10, 1896. He is an electrical engineering graduate of Pratt Institute, Brooklyn, New York. He is a member of the board of directors of Pratt Institute Engineers Alumni Association, Tau Beta Pi, and Sigma Phi Delta. Since 1922, he has been in the employ of the Western Electric Company, and on December 1, 1950, was assigned to Sandia Corporation, Albuquerque, New Mexico, on a loaned basis as special consultant. In September, 1951, his temporary assignment was changed to an indefinite leave of absence to Sandia Corporation. He has served the Maryland, New Mexico, and National Societies of Professional Engineers in various capacities during the past ten years and is at present a member of the National Committee on Resolutions. He is a former associate professor, College of Engineering Extension, and former lecturer on Industrial Hygiene, College of Education, of the University of Maryland. He is past president of the New Mexico Council of Technical and Scientific Societies, and a member of the Society of American Military Engineers.

New York. C. A. Dutton, P.E., born January 1, 1899, at Oneida, New York, is a graduate of the Massachusetts Institute of Technology with an S.B. in general engineering. He is now vice president, company director, and manager of construction sales for the Buffalo Electric Co., Inc. He was president of the Erie County Chapter of the New York State SPE in 1950-51 which also gave him the chapter "Engineer of the Year" award for 1956. He has held several offices on the state level and has been active on national committees; currently he is serving as chairman of the Resolutions Committee. He is a member of Rotary, the Buffalo Chamber of Commerce, the American Legion, the Niagara Falls Country Club, and several other organizations.

New York. Anatole R. Gruehr, P.E., began his engineering education in "Polytechnicum," Zurich, Switzerland. He received the degree of B.S. in E.E. from M.I.T., and M.B.A. and Ph.D. from the Graduate School of Business Administration of New York University. For thirty years he was associated with the Consolidated Edison Company of New York. He recently became head of the Economics and History Department at the Polytechnic Institute of Brooklyn. He has served as president of the New York Chapter of NYSSPE, as chairman of several chapter and state committees and as national chairman of the Engineers' Week Committee. He is now state zone director, as well as being national director. In 1952 he received the Distinguished Service Award of the New York Chapter. He is a member of AIEE, ASEE, and of various local organizations.

New York. Harold A. Mosher, P.E., is the assistant director of engineering for the Eastman Kodak Company at the Kodak Park Works, Rochester, New York. He is a native of Oklahoma City, and his educational background includes a B.S. degree from Occidental College in Los Angeles, California. His other engineering affiliations are with the American Society of Mechanical Engineers and the American Society of Heating and Air-Conditioning Engineers.

New York. George J. Nicastro, P.E., was born in Fairview, N. J., October 15, 1902. He received an M.E. from Stevens Institute of Technology in 1925. Since 1955 he has been sales manager in New York City for the Pacific Coast Engineering Company of Alameda, California. Prior to this he was district representative in New York for the Combustion Engineering Company from 1934 to 1955. He was also a district representative for the Edge Moor Iron Company of Edge Moor, Delaware, from 1933 to 1934. Prior to that he was an engineer in New York for the Foster-Wheeler Corporation from 1926 to 1933. He served as a cadet engineer for the American Can Company in Brooklyn, New York, from 1925 to 1926. He is active in both the New York Chapter and New York SSPE, having served as president of both as well as vice president of NSPE. He is a member of the ASME, having served as chairman of the Executive Committee of the metropolitan section. He has also been active in his alumni association, having recently served as its president.

New York. Herbert Roemmele, P.E., was born in New York City, January 1, 1904. He received a B.S. in M.E. from The Cooper Union in 1925 and an M.E. in 1934. A member of the faculty of The Cooper Union for the past 29 years, he currently is dean of students, and director of industrial and alumni relations. Upon graduation he joined the engineering staff of the General Electric Co. in Schenectady. Two years later he was invited by The Cooper Union to serve as an instructor in mechanical engineering, and by 1947 had been appointed to a full professorship in that subject. He is a past president of the New York State Society. He has served as chairman and member of many important committees on the chapter, state and national level. Dean Roemmele is chairman of the New York Engineers' Committee on Student Guidance, and holds memberships in many societies, including ASEE, ASME, AAUP, and in the national honorary engineering fraternities, Pi Tau Sigma and Tau Beta Pi.

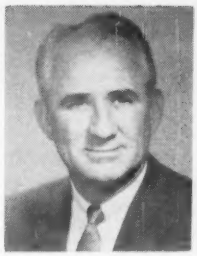
New York. Edward P. Smith, P.E., is a 1939 graduate of Kansas State College

Henry Campbell
Rhode Island

R. K. Rouse
South Carolina

Wm. F. Moehlman
Tennessee

Noah E. Hull
Texas



John Pratt
Texas

J. N. Thompson
Texas

J. Vernon Sharp
Utah

John B. McGaughy
Virginia

Kendall M. Wood
Washington

Leslie C. Gates
West Virginia

with a B.S. degree in electrical engineering. He joined the General Electric Company that year as a student engineer. In 1940, he became a design engineer in the Large Motor and Generator Department and for several years was engaged in the design of large synchronous and direct-current motors and generators. He was appointed manager of the department's D-C Motor and Generator Engineering in 1952. Mr. Smith earned his New York State license to practice professional engineering in 1948. Immediately thereafter he joined the Schenectady Chapter of NYSSPE and has served as its president and treasurer. He is Zone Director of the State Society and has served on various committees including chairman of the Membership Committee. He has held office in the Schenectady General Electric Engineers Association. He is a member of AIEE and is currently serving on the D.C. Machinery Subcommittee and the Test Code Coordinating Subcommittee.

New York. Leigh E. St. John, P.E., was born in Castle Creek, N. Y., March 14, 1899. He received an M.E. from Rensselaer Polytechnic Institute, Troy, N. Y., in 1923. Since 1950 he has been a partner in the Binghamton and Buffalo engineering firm of St. John, Platt & Carlson. Prior to the establishment of this firm, Mr. St. John was chief engineer of the Ansco Division of General Aniline and Film Corporation and prior to this time plant engineer of International Business Machines Corporation, Endicott, N. Y. He also served as assistant electrical engineer of Detroit Water Board, sales manager of Power Plant Supply Company, and district sales manager of Alco Products, Inc., He is a member of the Board of Examiners of Professional Engineers and Land Surveyors of the State of New York, trustee of Rensselaer Polytechnic Institute, member of ASME, AIEE, ASHAE, ASRE, AWWA. He is also a member of various civic organizations.

New York. Vincent G. Terrenzio, P.E., received his B.S. in C.E. from the College of the City of New York. He is a division engineer in the Research and Development Department of the New York Board of Water Supply. He is past president of the New York State Society, past director and Executive Committee member of the New York Society, and past chairman of NSPE's Ethical Practices Committee. He was recipient of the New York Society's "Engineer of the Year" award for 1956.

North Carolina. George S. Rawlins, P.E., was born in Geneva, New York, October 18, 1904. He received a civil engineering degree from Cornell University in 1926. Since 1941 he has been vice president of J. N. Pease and Company, engineers and architects, Charlotte, North Carolina. Prior to this association, he operated his own office in Charlotte. From 1937 to 1939 he was employed by the City of Charlotte on water works design. From 1926 to 1939 he was located in Reading, Pennsylvania, on water works design for that city and as an engineer for Wm. H. Dechant & Sons. He has been active in the Professional Engineers of North Carolina since its formation having held several offices, including the presidency. He is a member of several technical societies as well as civic organizations.

North Dakota. Edward J. Booth, P.E., was born in McClusky, North Dakota, July 14, 1910. He attended North Dakota State College School of Engineering. From 1933 to 1943 he was employed by Emergency Federal Works Agencies in an engineering capacity on various public works projects. Since 1943 he has been City Engineer of the City of Bismarck, North Dakota. He is a member of the American Public Works Association, The American Water Works Association, and a past president of the North Dakota Society of Professional Engineers.

Ohio, Raymond A. Freese, P.E., is a native of Cleveland and received his degree in Civil Engineering from Case Institute of Technology. He is division building manager of Armco Drainage and Metal Products, Inc., at Middletown, Ohio, having recently transferred from Cleveland where he served the same company as district manager for more than ten years. Prior to his affiliation with Armco, he was associated with a consulting engineering organization, contractor's engineer, and with the Ohio Highway Department as assistant division engineer. He is a charter member of the Cleveland SPE and held various chapter offices including the presidency in 1949. He is a past president of the Ohio SPE, and served two years as chairman of NSPE's Inter-Professional Relations Committee.

Ohio. Ronald A. Gordon, P.E., was born in Morgan County, Ohio, January 18, 1910. He received a B.C.E. degree from Ohio State University in 1935. From 1935 to 1939 he was a highway engineer in Ohio. In 1940 he became associated with the Clinton Construction Company at Wilmington, Ohio. In 1946, Mr. Gordon became a partner and the company expanded into the concrete business. In 1953 the contracting part of the business became The Clinton Asphalt Paving Co., which Mr. Gordon now serves as president. He has served two terms as vice president of Ohio SPE, and he is active in various business and civic groups.

Ohio. C. Raymond Hanes, P.E., received his civil engineering degree at Ohio State University in 1924. He is a structural engineer with the Bureau of Construction of the Ohio State Highway Department in Columbus. He joined the Highway Department in 1928—after a brief period in industry and private practice—and is a recipient of the 25-year Meritorious Service Award of the American Association of State Highway Officials. He is a past president of the Ohio SPE, and was the first president of the Maumee SPE, a chapter of the Ohio Society. He has also been president of the North West County Engineers Association. He is a member of Tau Beta Pi and Theta Tau.

Ohio. Paul A. Harlamert, P.E., was born in Kettlersville, Ohio, August 1, 1905. He received a B.S. in M.E. from Ohio State University in 1927. After four years of night school study, he received an LL.B. degree from Columbus College of Law. He passed the bar examination in January,

George McAlpin
West Virginia

Harold Trester
Wisconsin

1932. From 1927 to 1932 he was design and sales engineer for Hydraulic Press Manufacturing Company. He practiced law in Columbus, Ohio, from 1932 to early in 1935. Since May 1, 1935, Mr. Harlamert has been commodity manager, Johns-Manville Corporation, Cleveland, Ohio. He has been active in both the Cleveland Chapter and Ohio SPE, having served as president of both. He has served on several NSPE committees and is also active in the AWWA and FSIWA.

Oklahoma. W. F. Hildebrand, P.E., was born in Oklahoma, July 11, 1910. He received a B.E. degree in E.E. from University of Oklahoma in 1937. Since 1937 he has been with the General Electric Co., except for four years during World War II when he served as radar and communications officer in China-India Burma Theater of Operations. He has been active in both the Tulsa Chapter and the Oklahoma Society of Professional Engineers, having served as president of both. He is member of AIEE and other societies including American Petroleum Institute.

Oklahoma. Gerald W. McCullough, P.E., was born in Lynnville, Indiana, April 1, 1904. He received a B.S. in M.E. at Oklahoma A&M College, 1925. He was employed by Phillips Petroleum Company in 1925, and worked in Natural Gasoline & Gas Department until 1943, becoming chief engineer in 1937. He was made assistant manager, Defense Plant Division, 1943, and manager, 1944. He was appointed vice president and general manager, Phillips Chemical Company, wholly owned subsidiary of Phillips Petroleum, in 1948, and executive vice president and general manager, 1951. He became chairman, Operating Committee, Phillips Petroleum Company and subsidiaries, 1951, and vice president, Phillips Petroleum Company and chairman, Operating Committee in 1953. Since February of this year he has been manager, Natural Gasoline Department, Phillips Petroleum Company. He was second vice president of the Oklahoma SPE in 1951 and president in 1952. He has also been a member of the OSPE Planning Board. He is active in Rotary and various civic groups.

Pennsylvania. Carl L. Kreidler, P.E., was born in Freemansburg, Pa., July 25, 1908. He received a B.S. in civil engineering from Lehigh University in 1930 and an M.S. from the same school in 1932. Since 1936 he has been employed by the Lehigh Structural Steel Company in Allentown, Penna., presently holding the position of chief structural engineer. He has served as president of both the Lehigh Valley Chapter and the Pennsylvania Society of Professional Engineers. He is an active member of the American Welding Society and a member of that Society's Committee on Building Codes.

Pennsylvania. Robert F. Miller, P.E., of Tamaqua, Pa., is a consulting engineer to a number of Schuylkill County municipalities and industries. A past president of the Pennsylvania SPE, he has long been recognized for his work in behalf of the profession. He is chairman of NSPE's Legislative Committee. He was one of a group of members of the Reading Chapter who helped organize the new Anthracite Chapter in 1946 and later served it as president and state director. Mr. Miller was also one of the leaders of the group which successfully promoted the registration law passed by the Pennsylvania Legislature in 1945. He is also known for his work in Lions International and for his interest in community service. He also belongs to the AIMME, SAME, the Engineers' Society of Pennsylvania, and the Pennsylvania Sewage and Industrial Wastes Association.

Pennsylvania. D. C. Peters, P.E., president and general manager of the Mellon-Stuart Company, Pittsburgh, contracting engineers, graduated from Marquette University in 1938 with a B.S. in C.E. He is a member of various engineering societies, as well as the Young Presidents' Organization, and has been active in civic and civil defense planning in the Pittsburgh area. He has been chosen as one of one hundred young leaders of Pittsburgh's future by the local Chamber of Commerce and *Time Magazine* jointly.

Pennsylvania. L. Foster Tierney, P.E., was born in Hollidaysburg, Pa., December 21, 1902, and was educated in the Hollidaysburg schools, and St. Francis College, Loretto, Pennsylvania. Owner and chief engineer of Mulch Brothers, mechanical contractors, Hollidaysburg, Pa. Active in chapter and state activities and has been vice president since 1951 until elected president this year. Prepared and had adopted the present zoning ordinance of the Borough and at present, is a member of a board of adjustments. Served on a committee to make a survey and analysis of the water requirements of the Borough and at the present time is serving as treasurer of the Water Authority. He is a member of the board of directors of the Citizens National Bank, and a member of various civic and engineering societies and of the ASHAE.

Pennsylvania. John T. West, Jr., P.E., was born in Philadelphia, July 20, 1897. He studied mechanical engineering at Drexel Institute of Technology. He served Pennsylvania Power and Light Company in various positions in generation and power sales for twenty years. Also served Coxe Stoker Engineering Co., of Hazelton, Pa., for four years as sales engineer and spent five years with Lehigh Engineering Co., of Bethlehem, as mechanical engineer. Served as secretary and president of the Lehigh Valley Chapter PSPE and since March 1949 he has been secretary of PSPE. Also a member of ASME, SAME, ASEE and the Delaware SPE.

Puerto Rico. Alberto Hernandez, P.E., was born June 6, 1903, in Mayaguez, P.R. He received a B.S. in C.E. from the University of Puerto Rico in 1926 and an M.A. from Harvard in 1935. He has taught in the University of Puerto Rico's College of Agricultural and Mechanical Arts and has done engineering work in various capacities with agencies of the Island's government. He is now Chief, Technical Section, Puerto Rican Field Office, Public Housing Administration. He is a member of numerous professional engineering groups and of the New York Academy of Sciences.

Rhode Island. Henry Campbell, P.E., was born in Boston, Mass., May 28, 1915. Since 1946 he has been on the faculty of the College of Engineering at the University of Rhode Island where he is currently professor and head, Department of Civil Engineering. Prior to joining the university he served as designing engineer for Metcalf and Eddy, Boston, from 1940 to 1942. He was acting district engineer, Southeastern Health District of Massachusetts, Division of Sanitary Engineering, Massachusetts Department of Public Health, during 1943. He followed this position with three years in the Army as a lieutenant in the Sanitary Corps. He is a past president of the Rhode Island SPE, and is also a member of various other societies including ASCE and ASEE.

South Carolina. R. King Rouse, P.E., was born March 15, 1905, in Valdosta, Georgia. His academic and technical education was secured through attendance at schools in his home state and included the study of mechanical engineering at the Georgia School of Technology. During 1936 he organized his present firm, R. K. Rouse Company, which represents several manufacturers of heating equipment. He has been a member of NSPE since 1943 and was active in organizing the South Carolina Society, being its first president in 1948. He holds membership in Rotary and other local and national organizations, including the Society of American Military Engineers and ASHAE.

Tennessee. William F. Moehlman, P.E., was born in Madison, Wisconsin, August 7, 1897. He received his B.S. in C.E. at the University of Wisconsin in 1922. Since 1934 he has been active in business in Tennessee in a number of enterprises. He is president of Knox Concrete Products, Inc.; president of General Aggregate Corporation; president, Southeastern, Inc.; vice president, Tenn. Metal Culvert Co.; director, Concrete Products Co.; and director, Home Federal Savings & Loan Assn. He has been active in both Tennessee SPE and the Knoxville Chapter. He is past president of the Tennessee Valley Section of ASCE and a member of AAE and the Knoxville Technical Society. He has been active in civic affairs and served as president of the Knoxville Chamber of Commerce for three years.

Texas. Noah E. Hull, P.E., was born in Defiance County, Ohio, and educated in public schools in Noble County, Indiana. He received a B.S. in C.E. from Purdue University in 1917. Since January, 1951, he has been vice president and general manager, Hughes Gun Company, Houston, Texas, operating Dickson Gun Plant for the Army Ordance Corps. He is also assistant to the vice president-manufacturing, Hughes Tool Co. Prior to this assignment, Mr. Hull spent 12 years with General Motors Corporation in construction and plant engineering work; four years as plant engineer, Firth Carpet Co.; four years as chief engineer for National Gypsum Co., operators Bluebonnet Ordnance Plant, Mc-

(*Continued on page* 45)

With Our Members . . .

Broome Area Chapter Hosts

New York State SPE Holds Autumn Meeting—Honors Leigh E. St. John

Leigh E. St. John, consulting engineer from Binghamton, N. Y., was honored at the autumn meeting of the New York State SPE held in September. The Broome Area Chapter, one of twenty-seven chapters of the State Society, served as host for the three-day affair.

A national director of NSPE, Mr. St. John's ten years of service as a member of the New York State Board of Examiners of Professional Engineers and Land Surveyors was given recognition at a luncheon. He is the second vice president of the New York State SPE.

His other professional affiliations include membership in the American Society of Mechanical Engineers, American Institute of Electrical Engineers, American Society of Air Conditioning Engineers, and American Society of Refrigeration Engineers.

He is a member of the consulting engineering firm, St. John, Platt and Carlson of Binghamton.

One of the principal speakers at the meeting was Edgar W. Couper of Binghamton, a member of the Board of Regents, University of the State of New York, who spoke on "The Regents and the Professions."

James P. Peterson, of Windsor, is president of the Broome Area Chapter.

Pennsylvania Groups Hold Joint Meeting

The Westmoreland County Chapter of the Pennsylvania SPE held a joint meeting in September with other technical societies in the Westmoreland area. A tour of the Beaver Run Dam and filter plant of the Westmoreland County Water Authority took place, which was followed by a picnic.

Wisconsin Chapter Elects Thomas Higgins President

Thomas J. Higgins of Madison is the new president of the Southwest Chapter of the Wisconsin SPE, according to a recent announcement.

The other 1956-57 officers—all from Madison—include: Jack H. Maxfield, vice president; Williard W. Warzyn, past president; Donald B. Johnson, secretary-treasurer; and A. F. Ahearn, Leo F. Kosak, and H. L. Lautz, directors.

Garvin H. Dyer Talks To St. Louis Chapter

Garvin H. Dyer, of Independence, Mo., vice president of the National Society, spoke at the first fall meeting in September of the St. Louis Chapter of the Missouri SPE.

The subject of Mr. Dyer's address was "Integration of Membership."

"Sendoff Party" Staged For Engineering Students

A "Sendoff Party" for young students entering engineering colleges as freshmen this fall was sponsored recently by the Capital Chapter of the Illinois SPE. The party, which was held at the Hillsboro Country Club in Hillsboro, consisted of golf and swimming in the afternoon, dinner in the evening—followed by bits of "fatherly" advice from the engineers.

The Chapter had its annual family picnic in August.

R. J. Newbury Named Minnesota Exec. Sec.

Robert J. Newbury took over as full time executive secretary of the Minnesota SPE as of September 1. Newbury, formerly assistant executive secretary, succeeds Hal E. McWethy.

Receive Certificates In Idaho

The Southwest Chapter of the Idaho SPE was recently host at a dinner for eleven engineers in the Boise area who earned their professional licenses. Among those at the dinner were, l. to r.: Phillip A. Marsh, chapter vice president; Earl C. Reynolds, Jr., State Society vice president; Sumner M. Johnson, chapter president; Orland C. Mayer, secretary, Idaho State Board of Engineering Examiners, making the presentation; Sherman N. Weisgerber, Jr., chapter secretary-treasurer; Raymond J. Briggs, chairman, Idaho State Board of Engineering Examiners, and Finas C. Harvey, one of the eleven engineers present who received certificates.

Federal Highway Program Discussed By Engineers

"Aspects of New Federal Highway Program" was the topic of discussion at the September meeting of the Toledo (Ohio) Society of Professional Engineers.

Speakers for the meeting were George Lieber, division engineer for the State Highway Department, and Harold Kauffman, division location and design engineer, State Highway Department.

Missouri Society Sets Membership Goal of 800

A goal of 800 new members for 1956-57 has been established by the Membership Committee of the Missouri SPE, which will make MSPE's total membership exceed fifty per cent of all professional engineers residing in Missouri.

C. W. Schemm, of St. Louis, is chairman of the Committee. As of July 1, Missouri ranked seventh in the nation in NSPE membership.

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Restricted to Registered Professional Engineers . . . Directory Continued on Next Page

Certificates Awarded At Florida Meeting

The Miami Chapter, Florida Engineering Society, recently inaugurated a new ceremony in Florida—awarding registration certificates to newly registered engineers at a regular dinner meeting at the Chapter.

J. Wylly Keck, a member of the Florida State Board of Engineer Examiners, presided at the ceremony where twenty-one received certificates. It is planned—with the approval of the State Board—to make this a regular ceremony.

Pres. R. J. Rhinehart Speaks In California

NSPE President Robert J. Rhinehart addressed more than one hundred bay area chapter members and guests at a joint meeting recently in Palo Alto, Calif.

"Every registered engineer must do his utmost continually in educating the public, employers, government leaders, and other opinion molding groups as to the importance of the engineer to our national security and advancement of our civilization," Pres. Rhinehart stated.

NSPE Director Trester Speaks to Milwaukee Chapter at Fall Dinner

The first fall dinner meeting of the Milwaukee Chapter of the Wisconsin SPE was held in September with Harold Trester, a national director of NSPE, as guest speaker. His topic: "The Purpose, Development and Operation of Functional Groups within the NSPE Framework."

After a question and answer period following the talk, the four functional groups, namely, consulting, education, public employment, and industrial, met separately to make plans for the operation of their respective group.

Speakers on the noon luncheon programs of the Chapter for September have included George Lattin, civil defense staff in the office of General Carlton, who spoke on "Engineering Phases in Milwaukee Civil Defense Planning," and John Lieb, manager, patent licensing section, Allis Chalmers Manufacturing Company, who talked on "Protecting Your Ideas."

Scheduled to speak at a October 4 luncheon is Richard Perrin, executive director, Milwaukee Housing Authority. He will discuss the "Third Ward Redevelopment Program."

Reading Chapter Tours Lab, Hears Ethics Talk

A double feature program was on tap for members of the Reading Chapter of the Pennsylvania SPE at their September meeting.

The group first inspected the new research laboratory of the Pennsylvania Optical Company. One of the Chapters new members, Harold A. Marsh, is vice president of the company.

Members then adjourned to dinner, which was followed by a talk on "Ethics and Practice" by Robert L. Reitinger, state chairman, Ethics and Practice Committee.

Since 1952, Mr. Reitinger has been plant engineer at the Bristol Plant of Rohm & Haas. He is a member of AIEE, PSPE and the Engineers' Club of Philadelphia. He has been chairman of the Ethics and Practice Committee for the past two years.

Santa Clara Chapter Holds Joint Field Trip

A field trip in conjunction with the Engineers Club of San Jose was held by the Santa Clara Chapter of the California SPE in September.

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Texas-West Virginia

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By Mrs. Warner Howe, Chairman of the Ladies Auxiliary Advisory Committee.

Mrs. Fred L. Hendrick, who presided at the Ladies Auxiliaries meeting at the Annual Meeting in Atlantic City, received great praise for the 1956 issue of *Engineers Wives*, which will soon be in the mail to all Auxiliaries.

Newly elected Ladies Auxiliaries Advisory Committee members are:

Chairman — Mrs. Warner Howe, 344 Josephine St., Memphis, Tennessee. Area Vice-Chairmen, Northeastern Area—Mrs. Hugh Nelson, 1731 Oxford St., Erie, Penna.; Southeastern Area—Mrs. R. K. Rouse, 308 E. Fairis Rd., Greenville, S. C.; Central Area—Mrs. Harry G. Kennedy, 1738 London Heights Rd., Charleston, W. Va.; North Central Area—Mrs. Garvin H. Dyer, 10011 E. 36th St., Kansas City 29, Mo.; Southwestern Area—Mrs. Leonard White, 1620 N. Jackson, Little Rock, Ark.; Western Area—Mrs. Thomas M. Conley, 710 Peralta Way, Fresno, Calif.

This committee under the supervision of the Chapter Activities Committee Chairman, Mr. D. C. Peters, 210 East Parkway, Pittsburgh 12, Penna., is eager to help on any matters related to Ladies Auxiliaries.

From Fresno, California, Mrs. Howard F. McCaudless, president of the Auxiliary there, writes praising Mrs. R. J. Rhinehart's talk on Ladies Auxiliaries given at a luncheon during the California SPE meeting. The Fresno yearbook contains a roster of both the men's chapter and their Auxiliary—more economical and useful than printing separate yearbooks.

The Ladies Auxiliary to the Memphis Chapter of the Tennessee SPE, issues a yearly mimeographed roster and a monthly newsletter announcing date, program, and business of ensuing meeting. Members unable to attend regularly are kept informed.

The South Carolina SPE meeting was held June 23rd in Greenville, S. C. During the afternoon Mrs. Rhinehart was honored and the ladies entertained with a tea at the new home of Thomas A. Able, Jr., president of the South Carolina SPE.

(*Continued from page 38*)

Gregor, Texas, and five years (1946-1951) as manager, Plant Engineering Division, Hughes Tool Co. He has been active in the San Jacinto Chapter and Texas Society as chapter officer and TSPE director-at-large. He is a member of Triangle and Tau Beta Pi, Houston Engineers Club, ASCE, American Ordnance Association, Rotary Club, and the Houston Club, and is active in various civic groups.

Texas. John L. Pratt, P.E., was born in Commerce, Texas, October 30, 1906. He received a B.S. in E.E. from the Agricultural and Mechanical College of Texas in 1928. He became associated with the Allis-Chalmers Mfg. Company and following the completion of their Graduate Training Course was assigned to the sales organization of the Industries Group. He presently serves this division of the company as manager of the Southwest Region. He is a member of Tau Beta Pi, other engineering societies including AIEE, and various civic groups.

Texas. J. Neils Thompson, P.E., was born in Canyon, Texas, October 14, 1912, but moved early in life to Bay City, Texas. He received his B.S. and M.S. in C.E. from the University of Texas in 1935. From 1935 through 1940, he was with the Texas Highway Dept. In January, 1941, he joined the civil engineering faculty at U. T. where he holds the rank of professor. He is director of U. T. Balcones Research Center. He is active in various Texas business enterprises. He is a past president of Travis Chapter, TSPE, and past president of TSPE. He is a member of Sigma Xi, Tau Beta Pi and other honorary organizations, belongs to ASCE and other engineering societies, is past president of Austin Kiwanis Club and is active in various other civic activities.

Utah. J. Vernon Sharp, P.E., was born Sept. 18, 1905 in Salt Lake City, Utah. He received his B.E. in E.E. from the University of Utah in 1930. Upon graduation he worked as electrical engineer for the Felt Electric Co., of Salt Lake City, until 1934 at which time he went into business for himself. Since then he has owned and managed the Sharp Electric Co., Salt Lake City. He has been active in professional, business, civic and religious fields. He is a past president of the Utah Society of Professional Engineers, Utah Engineering Council, Utah Section I. E. S., Inter-Mountain Electrical Association, Salt Lake City Lions Club and past chairman of the Utah Section of AIEE. Appointed three times to Utah State Board of Engineering Examiners having served twice as its chairman. Member of Holladay, Utah, zoning board. Member of the High Council of the Holladay Stake of the Mormon Church, missionary to Mexico and founder of mission in South America for the Mormon Church.

Virginia. J. B. McGaughy, P.E., was born November 5, 1914, in Norfolk, Virginia, and he received a degree of B.S. in C.E. from Duke University in 1938. He is a past president of the VSPE and is a member of the Engineers Club of Hampton Roads, American Concrete Institute, Rotary Club, Virginia Club and Norfolk Yacht & Country Club. Mr. McGaughy is a partner in the firm of Lublin, McGaughy and Associates, Architects and Consulting Engineers, Norfolk, Virginia and Washington, D. C.

Washington. Kendall M. Wood, P.E., was born in Kansas City, Missouri, February 26, 1909. He received his B.S. in mechanical engineering from the University of Kansas in 1933. Since 1945 he has been in private practice, first as a partner in Daugherty Engineering Services and, since 1949, as sole owner, Kendall M. Wood & Associates. Prior to entering private practice he spent eight years as a civilian engineer with the U.S. Army Engineers. He has been active in both Spokane Chapter and the Washington SPE, serving as president of Spokane Chapter in 1952-53 and state president in 1954-1955. He is also an active member in ASME and ASHAE. Civic activities include Rotary and Shrine memberships.

West Virginia. Leslie C. Gates, P.E., was born at Dorothy, West Virginia, November 17, 1918. He received a B.S. in C.E. from Virginia Polytechnic Institute in 1940. For a period of one year he worked for the Solvay Process Company on plant expansion in Hopewell, Virginia. In 1941 he entered the service and was a major in the Corps of Engineers when he was released to inactive status in 1946. Since 1946 he has been an associate in the Ferguson-Gates Engineering Company, a consulting firm dealing primarily with the mining industry. He was first president of the Applachian Chapter and was the president of the West Virginia SPE in 1951. He is a member of AIME and ASCE, past president of the Beckley Area Chamber of Commerce, and an elder in the Beckley Presbyterian Church.

West Virginia. George W. McAlpin, P.E., was born in Cincinnati, Ohio. He received a C.E. degree from the University of Cincinnati. For several years he was with U.S. Engineer's Office, Cincinnati, on Ohio River lock and dam surveys, design and construction. He was associated with National Contract Co., Evansville, Indiana, as superintendent and engineer on lock and dam construction. In 1922, he formed a partnership, Skene and McAlpin, Pt. Pleasant, West Virginia, to engage in general engineering and construction. He entered the service of State Road Commission of West Virginia in 1933 as district engineer. In 1936, he organized the Planning Division and subsequently became regional construction and then state construction engineer. He was appointed assistant chief engineer in 1955. He is past president of West Virginia SPE, and past president and national director, West Virginia Section of ASCE. He is a member of AASHO, SEASHO, ARBA and Highway Research Board.

Wisconsin. Harold C. Trester, P.E., was born in Sheboygan, Wisconsin, July 3, 1911. He received a B.S. in C.E. from the University of Wisconsin in 1935. Since 1948 he has been an associate in C. R. Meyer and Sons Company, Contractors and Engineers, in Oshkosh. Prior to this, Mr. Trester was with the Wisconsin Highway Commission from 1935 to 1939; structural engineer with Cook & Brown of Oshkosh from 1939 to 1942 and 1945 to 1948; and district structural engineer with the U.S. Engineers, Savannah, Georgia, from 1942 to 1945. He has been active in both the Fox River Valley Chapter and the Wisconsin SPE, having served as chapter president in 1949, state director in 1950, and national director since 1954. He is a member of Chi Epsilon, Tau Beta Pi and Triangle, and other engineering societies including ASCE and ACI.

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—AE—

TRANSITS—Warren-Knight Co. has issued a new folder on their Precision Transits offering 29 features, plus specifications and time saving pointers. The firm also has available a new price list, effective August 1, covering their Eleventh Edition Catalog on transits and levels, engineering field equipment and drafting room supplies. Request Information AE 610 from Warren-Knight Co., 136 N. 12th St., Philadelphia 7, Pa.

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PUMP LOCATION—A new Engineering Release on "Pressure Effects of Pump Location Relative to the Compression Tank" is available from Bell & Gossett Co. The new release offers an extremely simple answer to problems such as unheatable top-floor circuits, noisy, cavitating pumps, and unventable airbound radiation. The answer to virtually all these problems lies in the proper placement of the compression tank. Obtain by writing to Bell & Gossett Company, Morton Grove, Illinois.

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NOISE CONTROL—"So You Want to Increase Production!" is the name of a new, 8 page publication offered by The Korfund Company, Inc., 48-23R 32nd Place, Long Island City 1, N. Y. This bulletin, designated K7A, shows by means of authentic case histories how profits and production can be increased through vibration-and-noise-control machinery mountings. Describes how Korfund mountings permit most efficient plant layout, utilization of all available space, prevent rejects, and eliminate down-time. Explains the theory and purpose of machine tool vibration control and discusses the problem of leveling versus alignment. Obtain from Korfund at above address.

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COLD WATER DEAERATOR — Cochrane Publication 4653 describes the many advantages of cold water deaerators and their principles of operation. Some of the advantages of the Cochrane Cold Water Deaerator are: 1. Reduces or eliminates corrosion; 2. Complete deaeration without heating or cooling; 3. Tremendous spilling edge for maximum deaerating efficiency; 4. Multiple stage units permit economical deaeration. Request from Cochrane Corporation, 17th St. below Allegheny, Philadelphia 32, Pa.

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PROTECTIVE COATINGS — Publication of a new Paint Manual, Tygon Protective Coatings Bulletin #760, is announced by The U. S. Stoneware Co. This new manual is designed for use as a practical work book, presenting useful painting data in the form of charts, tables, diagrams and illustrations. Virtually all factors relating to the use of Tygon Protective Coatings in mild to severe corrosive service are covered in detail. A table of chemical resistance is included which gives the resistance rating of each coating to over 200 corrosive agents. Of special interest is the section dealing with ADT Hot Spray Paint which gives a detailed explanation of this important new system of protective maintenance painting. Also discussed is a proven method of successfully priming rusty surfaces without previous surface preparation using Tygorust, a "no-prep" Primer. Tygon Protective Coating Bulletin #760 may be secured without cost by writing to Robert Hartenstein, Plastics and Synthetics Division, The U. S. Stoneware Co., Akron 9, Ohio.

—AE—

HOT SPRAY—The Spee-Flo Co., manufacturers of hot spray equipment, have published a revised and enlarged edition of "WHY HOT SPRAY?" Lists the major benefits of hot spray application of finishing materials and explains each benefit in detail. Case histories are cited to illustrate each benefit. Available without charge by writing to The Spee-Flo Company, 720 Polk, Houston 2, Texas.

INSULATION — A new 4-page, 2 color brochure describing GILSULATE insulation for hot underground pipes has been published by American Gilsonite Co. The brocure discusses problems of underground pipe insulation. On-the-job photographs illustrate ease of application; brief technical data are also included. Available on request from American Gilsonite Company, Salt Lake City, Utah.

—AE—

WELDED FITTINGS — Various types and sizes of welding fittings and flanges are described in the new six-page folder released by the Tubular Products Division—Fittings Department—of The Babcock & Wilcox Company. This folder, identified as FB-502, describes briefly but completely the full line of carbon, alloy and stainless steel seamless welding fittings and forged steel flanges handled by B&W. Obtain from the company, Beaver Falls, Pa.

—AE—

TESTING EQUIPMENT—New 128 page catalog by SOILTEST, Inc., 4711 W. North Ave., Chicago 39, Ill., contains descriptions and illustrations of over 1350 items of apparatus for engineering tests of soils, concrete asphalt and construction materials. Includes suggested laboratory layouts with equipment lists and excerpts from ASTM and AASHO specifications. Lists complete testing equipment for the field or laboratory in construction, research, manufacturing, education and military work. Request from SOILTEST.

—AE—

ALUMINUM EXTRUSIONS — A new aircraft aluminum extrusion catalog is available from Pioneer Aluminum Supply Company of Los Angeles. Features a cross-reference section which relates the extrusion die numbers of 23 major airframe manufacturers, plus Alcoa, to an AND (Army-Navy Drawing) or Pioneer Aluminum stock number. Request from Pioneer Aluminum Co., 5251 W. Imperial Highway, Los Angeles 45, Calif.

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SEWER PIPE GASKETS—A new type rubber joint for coupling standard small diameter bell and spigot concrete sewer pipe, is fully illustrated and described in a brochure released by Hamilton Kent Manufacturing Co. Gaskets are for pipe from 4" to 24" in diameter. Method of application is fully explained and photographs show how the gasketed pipe is installed. Obtain by writing to Hamilton Kent Manufacturing Co., 427 West Grand St., Kent, Ohio.

—AE—

ROCK DRILLS—A new 12-page bulletin describing Le Roi-Cleveland rock drills has been issued by the Le Roi Division, Westinghouse Air Brake Co., Milwaukee, Wis. The three-color bulletin illustrates breakers, sinkers, clay spades, tampers, and wagon drills. Cover tool design and construction, operator handling and care, and maintenance features leading to longer tool life. The lubrication system, drill and blow actions, and valve and piston design receive special attention. Copies of the bulletin may be obtained by writing the Division's Sales Promotion Department.

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STRICTLY BUSINESS

Personalities . . . A new manager of engineering, **Weems E. Estelle,** has been appointed by the Edison Voicewriter Division of **Thomas Edison, Inc.,** West Orange, N. J. . . . **E. V. Miller** has joined the firm of **Johannessen and Girand,** consulting engineers of Phoenix and Tucson, as engineer in charge of the firm's highway division. . . . The election of **H. Monteith Albers** as president of the **Kensington Steel Company,** Chicago, Ill., has been announced. . . . **Clarence P. Baird** has been named field engineer for the Hoffman Radio Division, **Hoffman Electronics Corporation,** Los Angeles, Calif. . . . Five personnel advancements in the Telecommunication Division of **Stromberg-Carlson,** a division of **General Dynamics Corporation,** have been announced. They are: **William A. Rockwood,** assistant general manager; **Robert E. Dobbin,** chief engineer; **W. Wallace Weedfall, Harry M. Bruckart,** and **Malcolm P. Herrick,** assistants to the vice president. . . . **Earl V. Akerlow** has been appointed an assistant division manager in the Engineering Department of **Kaiser Engineers,** Oakland, Calif. . . . **Dietrich Timmerman** has been appointed chief engineer of the Rolling Mill Department of the **Birdsboro Steel Foundry and Machine Company,** Birdsboro, Pa. . . **Dr. Robert E. Payne** has been named director of research for the **Sharples Corporation,** centrifugal and process engineers, Philadelphia, Pa. . . . **Clifford B. Bronson** will serve as an engineering consultant to the New York office of **L. B. Foster Company,** the firm has announced.

Mr. Estelle

Ralph L. Gray has been named president of **Armco Steel Corporation,** Middletown, Ohio. . . . **Acheson Colloids Company,** Port Huron, Mich., has announced the appointments of **E. Ralph Egloff** and **Frank H. Mrozek** as service engineers. . . . **James T. Stewart** has been appointed to the newly-created position of chief industrial engineer for **W. C. Ritchie and Company,** Chicago, Ill. . . . **Charles E. Smith** has been named northeast regional sanitary engineer for **Chain Belt Company,** Milwaukee, Wis. . . . The appointment of **Robert I. Patten** to the position of general manager and partner of **Paddock Pool Builders, Inc.,** Atlanta, Ga., becomes effective October 1. . . . **Lockheed's Missile Systems Division,** Van Nuys, Calif., has announced the appointments of **Richard H. Graham** as staff scientist for nuclear engineering and **Everett E. Christensen** as assistant flight test division engineer. . . . **George Shinbrot** has been appointed an engineer in the Air Appliance Division of the **U.S. Hoffman Machinery Corporation,** New York City. . . . **E. O. Boshell,** chairman of the board, **Westinghouse Air Brake Company,** has announced the election of **A. King McCord** as president. . . . **Aldo Macchi** has joined the staff of **Jet-Heet, Inc.,** Englewood, N. J., as a project engineer.

Mr. Gray

Former Michigan Governor **Murray D. Van Wagoner** has been appointed to the board of directors of **American Forging & Socket Company,** Pontiac, Mich. . . . **Eli R. Lupin** has been named chief of engineering and development of **Sherman Products, Inc.,** Royal Oak, Mich. . . . **Blaw-Knox Company,** Pittsburgh, Pa., announces the promotion of **James H. Elkus** to the postion of manager of company facilities construction. . . . The appointment of **Robert W. Boesel** as chief project engineer for the Guided Missiles Division of **Republic Aviation Corporation** has been announced. . . . **Richard E. Tisch** has been named manager of the new product development engineering department at the **Minnesota Rubber & Gasket Company.** . . . **Carl H. Moeller** has joined the contract engineering group at the San Francisco headquarters of **Enterprise Engine & Machinery Company.** . . . The **Le Roi Division, Westinghouse Air Brake Company,** Milwaukee, Wis., has appointed **Don Blackmar** as chief metallurgist. . . . **Jack E. Leisch** has joined **De Leuw, Cather & Company,** engineers, Chicago, Ill.

Mr. Van Wagoner

Construction . . . The New York civil engineering firm of **Brown & Blauvelt** will shortly begin preparation of engineering plans for extending the Hejaz Railroad 500 miles south from Ma'an, Jordan, to Medina, Saudia Arabia. Estimated costs will run between twenty-five and fifty million dollars.

Operational Expansion . . . The **Portland Cement Association** has announced an expansion of its field services. Personnel in the new offices include: **Hugh Barnes,** manager of the Western regional office, Los Angeles, Calif.; **John M. McNerny,** district engineer, Los Angeles, Calif.; **Albert L. Blackwell,** district engineer, Trenton, N. J.; **Daniel Webster,** district engineer, Portland, Me.; **William J. Moore,** district engineer, Baltimore, Md., and **Jesse J. Farra,** district engineer, Louisville, Ky. This expansion raises the total number of the Association's regional offices to five and of its district offices to thirty-two.

Mr. Blackwell

Retirements . . . **Parsons, Brinckerhoff, Hall & MacDonald,** engineers, New York City, have announced retirement of **Eugene L. MacDonald** and **Lawrence S. Waterbury** as general partners. They will serve as consultants to the partnership. . . . **Reynolds, Smith and Hills,** architects and engineers, Jacksonville, Fla., have announced the retirement of **John F. Reynolds** as a partner. He will remain on the staff as a consultant. . . . Detroit Edison Vice President **Fred A. Compton** has retired after more than forty-two years with the company.

What's New

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NEOPRENE CAPS PREVENT CORROSION — Item 1

Internal corrosion of stored pipe and tubing is prevented by slip-on end caps of neoprene. Effectively seal out air, moisture, corrosive fumes, dust—and small animals. By simply adding a small amount of dehydrating agent before slipping on easily fitted caps, the inside of expensive alloy tube stock is protected from corrosion. Retard drying of threaded pipe dope and keep threads free of sand and grit. Made of rugged Du Pont neoprene highly resistant to oil, acids and other chemicals, sunlight, and weather.

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LIGHT WEIGHT FUME HOODS — Item 2

Light weight corrosion resistant fume hoods, ducts and stacks recently introduced by the Haveg Industries, Inc., are made of polyester glass plastic. Among the advantages claimed are light weight, high impact strength and a very high corrosion resistance to hydrochloric acid and other fumes normally corrosive to other materials. The ease of field fabrication, both for initial construction and possible changes, makes the polyester resin glass reinforced hoods especially suitable for industrial fume removal applications. It is claimed that both initial material cost and installation and maintenance cost are substantially lower.

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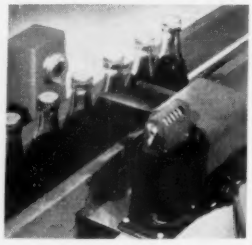
PHOTO-ELECTRIC CONTROL — Item 3



Here's a reliable and inexpensive control that simply plugs in like a lamp. The light source unit directs the light beam into the photo-electric tube. Any object can be made to cut off the light beam—even freshly painted parts, or parts so delicate that mechanical fingers cannot be used. Can separate objects according to height. Contacts control 10 amperes at 110 volts AC, 60 cycle, enough current to operate counters, magnetic relays, solenoids, and many other magnetic devices.

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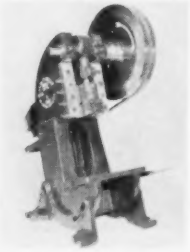
HEAVY-DUTY 5-TON PUNCH PRESS — Item 4



Added to the Allen Punch Press Line is the completely new, heavy-duty model B-5, 5-ton. Will perform up to 280 operations per minute on continuous punching, shearing, forming, riveting, blanking, cutting, drawing, etc. in leather, fibre, plastics, textile, paper, metal, or any workable material within rated capacity. Heavy 65 lb. flywheel assures ample power for heavy-duty operations. Ram can be easily adjusted for die setting with standard wrenches.

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"EASY SHIFT" VERTICAL DRAFTING BOARD — Item 5

L. A. B. Corporation has introduced a new "Easy Shift" Vertical Drafting Board, designed to reduce draftsman fatigue. Vertical feature of the board prevents dirt and dust collecting on drawings and eliminates smudging. Drafting machine rests on the drawing with feather touch. Board available in two models, one with fixed board angle of 15° from vertical and the other adjustable through an arc of 85° from vertical. Both have up and down adjustment of 20", permitting draftsman to work, seated or standing, at optimum visual angle.

This column describes new products of general interest to professional engineers. For further information, fill in the coupon provided and mail to the AMERICAN ENGINEER.

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EXPANSION-JOINT WATERSTOP — Item 6

Plastic-Grip, a 3-in-1 joint, made of extruded plastic (poly-vinyl-chloride) can be used as an expansion joint, as a construction joint or as a waterstop. Comes in continuous strips 100 feet long and 5" or 6" wide. Can be cut with a knife and spliced with a hot iron in minutes. Deep grooves grip concrete and exclusive reinforced "U" shaped center pleat expands and contracts with the joint. Is alkali and acid resistant.

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SYNTHETIC PORCELAIN CERAMIC — Item 7

Sauereisen Cements Company announces the development of a Synthetic Porcelain Ceramic to be known as Sauereisen Pour-Lay Cement No. 54. Makes ceramic-like products for technical and industrial use by a cold-set process without kiln firing. Supplied in two parts, a dry Filler and a liquid Binder. Hardens with an initial set in approximately 30 minutes and a complete set in 6 to 12 hours at ordinary temperatures. May be impregnated with various materials for non-porosity. Resists water, oil, electricity, solvents, all acids (except hydrofluoric) and temperatures to 2000°F. Mechanical strength is about the same as concrete.

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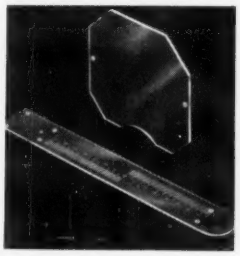
PLASTIC ANTISTATIC TRANSPARENCY — Item 8

A new thermosetting plastic developed by the Homalite Corp., permits use in many places where formerly plastics were not satisfactory. Called Homalite 141, the plastic has inherent antistatic qualities which prevent the accumulation of static electricity on its surface. This material is ideal for sensitive instruments where static affects accuracy and for similar applications. It does not attract or pick up dust and its properties are retained indefinitely.



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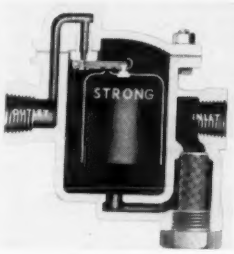
TRAP WITH BUILT-IN STRAINER — Item 9

The new 140-S Hydro-Flex Steam Trap has been announced by Strong Steam Specialties Division, Strong, Carlisle & Hammond. Distinctive feature is the built-in stainless strainer which prevents clogging and reduces cleaning maintenance time. Strainer is located on inlet side to catch foreign matter before clogging trap. Strainer screen is installed in a vertical position for quick removal and cleaning. Other features: small size and weight, "Hydro-Flex" bucket action, durable semi-steel body and all stainless steel working parts.



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DIGITAL READ-OUT AUTOMATIC MICROMETER — Item 10

The new Model HDR Carson-Dice Digital Read-out Electronic Micrometer eliminates human error in precision measurements. With this new instrument the exact dimension of a part is determined. Eliminates the human sense of touch in setting the instrument. The Digital Read-out counter on the front of the instrument displays the exact reading in ten-thousandths of an inch. Five divisions between each digit on the unit wheel permits readings to 20 millionths of an inch.

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Defense

(*Continued from page* 17)

and hospitals. Criteria and typical plans have also been developed and published for the construction of family quarters. Uniform standards and criteria are in preparation for mobilization, or emergency construction, and for air conditioning.

IN THE important field of protective construction, a Department of Defense Directive establishing uniform policy, and a Department of Defense Instruction providing technical guidance have been completed.

In major areas of construction, the services of carefully selected architect-engineers are used to advantage in the development of requirements, standards, and criteria. Among such studies, which have been completed and reported to the military departments, are "Airfields and Airfield Facilities," which has provided reliable information on which to base Department of Defense policy for both Navy and Air Force air base construction; "Effects of Military Aircraft on Airfield Pavements," and "High-Speed Refueling Systems for Fighter Aircraft." A comprehensive study of "Warehousing Facilities" has resulted in the development of sound recommendations for the uniform design and construction of military warehouses. These reports are for the use of the military departments and their contractors, as required, and not for general distribution.

A construction cost-reporting system has been developed, is now in operation, and is providing accurate data from the three military departments on cost trends for the major types of construction, including buildings of all categories, liquid fueling facilities, and paving. These data are proving invaluable in establishing uniform estimates in military public works program review, and in construction surveillance.

The Military Construction Act of 1956, about to be enacted, provides new authorization in the total amount of $2,138,886,000 for the three military departments, from which it is evident that new contract awards, including facilities for the reserve forces, will be of continuing magnitude.

The Military Construction Program, described above, is only one of the many programs in our defense effort where engineers from Government and industry are applying their talents and energy in an outstanding manner. The tempo, particularly in the fields of creativity and cost reduction, must be increased many fold, and there is ample opportunity for all engineers who are not afraid to work and to support their ideas to participate in the program.

Are you as a Professional Engineer doing your part?

—***End.***

About the Author . . .

Mr. Fulling

Roger W. Fulling, P. E., was graduated from the University of Delaware in 1932 with a B.S. degree in mechanical engineering. He joined du Pont in 1934 as a rodman on construction at the Edge Moor, Delaware, plant and progressed rapidly while serving on construction field jobs. In 1940 Mr. Fulling was assigned to the War Construction Division of the du Pont Company as a construction division engineer, and he later became division superintendent.

In 1945 he was transferred to the Industrial and Development Engineering Division of the Engineering Department as assistant to the director. In 1946 he was appointed manager of the Engineering Department Planning Division, and in 1948 he was named assistant manager of the Engineering Service Division. In 1951 he became atomic engineering assistant manager for the Engineering Department, and later was appointed atomic engineering manager.

Mr. Fulling was on loan from the du Pont Company to the Department of Defense serving as Director of Construction in the Office of the Assistant Secretary of Defense for Properties and Installation and as Acting Assistant Secretary of Defense for Properties and Installation. Upon return to du Pont Company in April, 1956, he was assigned to Development Engineering Division, Mechanical Development Laboratory, as staff assistant.

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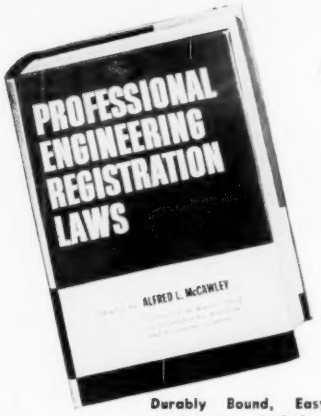

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The major purpose of the *Criteria* is perhaps best summarized by the continuing language from the introduction:

"As most engineers are employees, professional recognition is most significant in its application to the employed engineer-employer relationship. The professional status of the employed engineer, in all of its manifold aspects, needs to be fully recognized by the employed engineer and his employer if full and complete professional growth of the engineering profession is to be developed."

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  - Engineering Titles
  - Personnel Practices
  - Termination Policies

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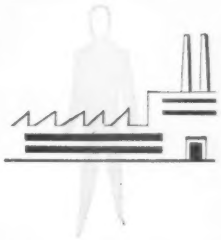

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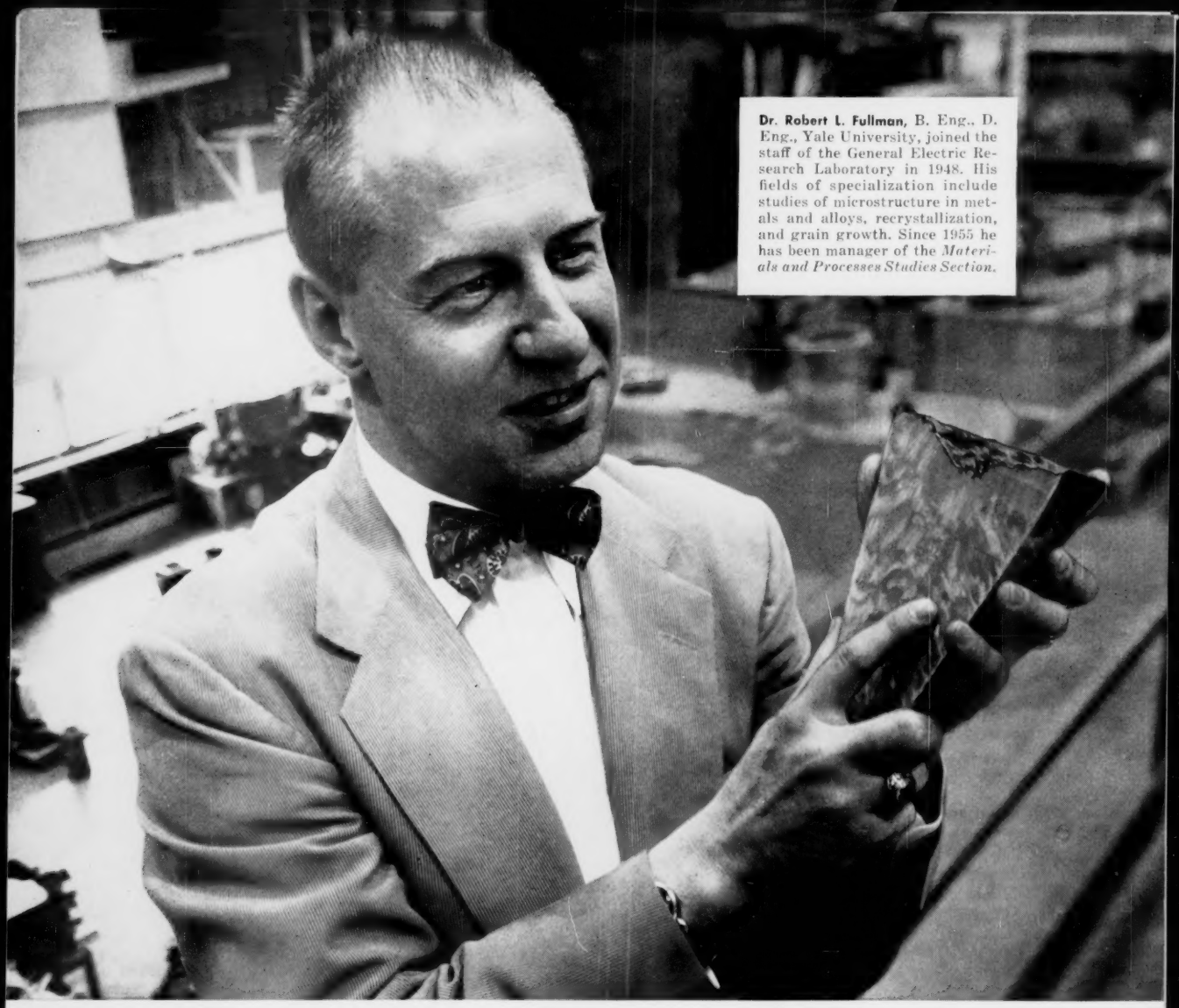

Dr. Robert L. Fullman, B. Eng., D. Eng., Yale University, joined the staff of the General Electric Research Laboratory in 1948. His fields of specialization include studies of microstructure in metals and alloys, recrystallization, and grain growth. Since 1955 he has been manager of the *Materials and Processes Studies Section.*

Better ways to make modern metals

Dr. Robert L. Fullman of General Electric applies basic studies to improve the properties of materials

The most direct way to make a metal object in a desired shape is simply to melt the metal and then "freeze" it in a mold. And scientists now believe there is *no fundamental reason* why castings should not be as strong and ductile as wrought metal.

Dr. Robert L. Fullman of the General Electric Research Laboratory is the leader of a group that is relating *microstructure* to the properties of metals — and then seeking processing methods to produce the desired structure. The basic mechanism by which molten metals *begin* to "freeze" — nucleation — has been modified through the application of recently developed theories; work in this area already has resulted in practical new materials whose improved properties are attributed to smaller grain size.

Dr. Fullman believes that when it is possible to control the *growth* as well as the *nucleation* of crystals, many of tomorrow's superior metals — for applications ranging from appliances to aircraft — will be made by methods as simple as those now used for cast iron.

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